THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. XVII. No. 403—20th YEAR.] LONDON, MARCH 31, 1868. [Subscription per Ann. { 15s. in Advance / 18s. Credit.] DOUBLE No. Price 1s.

RAMSAY'S NEWCASTLE CANNEL
COAL. Analysis by Dr. FYFE, M.D.:—
9746 cubic feet of gas per ton of coal.
26-candle gas.
13¼ cwt. coke per ton of coal.
N.B.—Ramsay's Cannel most resembles the Marquis of Lothian's Cannel, but superior as to coke.
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DO. GARESFIELD COKE.

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FIRE-BRICK WORKS, established 1804.
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Patentees of the Standard Gasometers for the Government, and of the
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1862.
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JOSEPH COWEN and CO.,
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Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS RETORTS and OTHER OBJECTS in FIRE-CLAY," and they have also been awarded in the INTERNATIONAL EXHIBITION of 1862, the PRIZE MEDAL for "GAS RETORTS, FIRE-BRICKS, &c., for EXCELLENCE of QUALITY."
J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts in the United Kingdom; and orders for Fire-Clay Retorts of all shapes and dimensions, Fire-Bricks, and every other article in Fire-Clay are promptly executed at their Works as above.
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LESMAHAGO GAS OR CANNEL COAL.
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Auchinheath, Lesmahago, March, 1868.

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LONDON, 1862.

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PRIZE
FOR

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PARIS, 1867.

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AT THE
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JOURNAL OF GAS LIGHTING WATER SUPPLY PAPER

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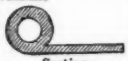

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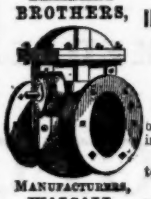

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Manufacturer of Clay Retorts, Fire-Bricks, and every description of Fire-Clay Goods.

THE

UNIVERSAL EXHIBITION OF PARIS,

1867.

SILVER MEDAL.

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DRY GAS-METER MANUFACTURER,

CLERKENWELL GREEN, LONDON,

HAS BEEN AWARDED THE HIGHEST PRIZE FOR

DRY GAS-METERS,

BY THE IMPERIAL COMMISSIONERS FOR THE

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Established 1816.

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STATION-METERS AND GOVERNORS.

Which can be seen at all the London Gas-Works. Also Liverpool, Manchester, Sheffield, Nottingham, Belfast, Glasgow, Birmingham, Dublin, Bristol, Leeds, Leicester, Brighton, Southampton, Sunderland, Wolverhampton, Bradford, Norwich, &c., &c.

TEST GASHOLDERS, EXPERIMENTAL METERS, EXHAUSTER REGULATORS,

MINUTE CLOCKS, PRESSURE GAUGES, PHOTOMETERS, PRESSURE REGISTERS, &c.

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G. C.—*The works are worth from £80 to £90 a year when the retorts are repaired and added to, so as to make them sufficient for producing the gas required, or the tenant might be allowed a year's rent in consideration of his taking such repairs and additions on himself.*

THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, MARCH 31, 1868.

Notes upon Passing Events.

It was a remark of the late Robert Stephenson that few men were able to make an experiment of any value in evidence; that is, few men, even with competent scientific acquirements, are sufficiently exact about facts. Daily experience proves the soundness of this observation; an experimenter should not only be exact but impartial. If he has made up his mind beforehand as to what he wants to prove, he is very apt to prove it. Very active and influential parties are anxious to float on the next financial flood—the flood that is sure to occur when the waters of investment have been dammed up a certain time—a gigantic scheme for superseding all existing water-works of London by a new supply from Cumberland, or Westmoreland, or from Wales and the sources of the Severn. To prepare their way they naturally look about for evidence. The most useful evidence is that of scientific men, who are supposed to be versed in that very vague thing—sanitary science. The highest class of scientific men are not to be bribed; if caught at all, like big trout, they are tickled, and thus caught more easily than by any golden bait. There is something so fascinating in the idea of being connected with a work of utility of more than Roman grandeur. It is only thus that we can account for the blunder into which Dr. Frankland fell when he reported a most alarming degree of impurity in the water supplied by the Kent works from their well at Bromley. Dr. Frankland, of whom we wish to speak with all the respect due to a very accomplished chemist, does not appear to know how to make a self-responsible analysis of water. If he did, he would have gone down himself, seen the water drawn from the well with a clean instrument, and having poured it into clean bottles, proceeded at his leisure to a careful analysis. But a concurrence of evidence leaves us no room to doubt that either the water collected for the doctor's analysis was carelessly transferred through dirty pipes and bottles, or that one of the agents he employed failed to collect a veritable sample. An analyst of a truly impartial mind might have doubted the correctness of his analysis; but Dr. Frankland was apparently too much pleased with the result to have any doubts, and so lost no time in circulating, through the publications of the Registrar-General, the truly libellous report on the water of the Kent Water-Works which reappeared in this JOURNAL on January 7, pages 21 and 22. The pith of the report is contained in the following words:—"The results of the analysis of the Kent "Company's water, at Bromley, show that it is of an entirely "different character from that delivered by the same company "at Deptford. Not only is the *previous* sewage contami-"nation of the Bromley water very high, but the presence of "a large quantity of ammonia shows contamination to have "occurred very shortly before the water was delivered to the "consumers. The use of this water for domestic purposes is "very undesirable." In reply to this grave charge, the Kent Company and the Local Board of Bromley applied to other analytical chemists; Dr. Letheby, Dr. Odling, and Dr. Williamson were consulted, and made separate analyses. Each reported that the Kent water possessed an unusual degree of purity. Dr. Letheby relates how, when, and where he obtained his sample, drawn before his eyes, and in a letter on the subject, says:—

> Having made very careful analyses of the Kent water, month by month, for nearly three years, and having failed to discover at any time the least trace of what can be termed sewage contamination; and having, moreover, made two analyses of the Kent water in the very month to which the Registrar-General's remarks apply, I was surprised to find it stated that the Kent water was in all respects the worst supplied in the metropolis.
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> So far is this from the case, that every month, for the last two years, I have reported to the Association of Medical Officers of Health of London, that the amount of organic matter contained in the Kent water is so insignificant as to be hardly discoverable by the most refined processes of chemical research; when, for example, the water is examined in a long glass tube, it is found to be as blue and free from organic tint as distilled water, and when it is tested by means of an oxidizing agent (permanganate of potash) the amount of oxygen required to oxidize everything in it of an oxidizable nature, does not amount to the 100th part of a grain per gallon of water; in fact, the average amount of organic matter in the Kent water for the last twelve months does not exceed the tenth of a grain per gallon, or one part of organic matter in 700,000 parts of water; and during the very month referred to in the Registrar-General's report, the quantity of organic matter in the sample, which my assistant took from a main-pipe at New Cross, was so small as not to be capable of estimation.
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> How, then, are these discrepancies of opinion regarding the quality of the Kent water to be reconciled? This is easily done by considering that the expression used by Dr. Frankland, as regards a supposed *previous sewage contamination*, is but a figure of speech; and however alarming it may be to those who have no knowledge of its true signification, it really means no more than that at some time in the world's history, perhaps in an ante-diluvian period, a hypothetical quantity of organic matter had been deposited; and that in subsequent time the water, while percolating and slowly finding its way through the fine fissures of the chalk, had dissolved the animal matter, which had then undergone such a thorough change by oxidation as to leave its mark in a scarcely discoverable amount of combined and harmless nitrogen. The change, indeed, of this so-called previous sewage contamination is as complete and as salutary as that which occurs within the growing plant in the transformation of manure into food; and and it would be just as true and as pertinent to say that the nitrogen in the bread which we eat represents a certain amount of sewage contamination.
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> Unfortunately, these exaggerated views of the pure chemist, when contemplating the facts of pathological or physiological science, are apt not merely to alarm unnecessarily the public mind, but they offer serious impediments to the progress of sanitary knowledge, and also weaken the confidence of the public in the usefulness of protective medicine.

We have not space, in our present number, for extracts from the letter of Mr. Morris, the engineer of the Kent Water-Works Company, which contains some excellent points worth the consideration of those interested in the question. We earnestly call the attention of Dr. Frankland to Dr. Letheby's last sentence, which we repeat:—"Unfortunately, these "exaggerated views of the pure chemist *offer serious im-"pediments to the progress of sanitary knowledge, and weaken "the confidence of the public in the usefulness of protective "medicine.*" No person who has paid any serious attention to the subject doubts that there exists in the midst of our social arrangements a large amount of dirt and preventible disease, which it is the duty and for the advantage of those charged with municipal government to remove in the best manner science and experience dictate. A great

obstacle to be encountered in introducing the necessary sanitary machinery, and in bringing out indispensable improvements, is the prejudice of the half-educated tax-paying members of the community. The introduction of town drainage and water supply into many districts was retarded for years by the inflated reports issued and the fantastic tricks played by the doctors and engineers of Mr. Edwin Chadwick's school.

We had an instance the other day at Manchester of the discredit into which "protective medicine" has fallen, through the extravagant, impracticable utterances of certain sanitary doctors. Manchester is a place with a natural aptitude for dirt, arising from its situation, occupations, and damp climate. It has a constant supply of the poorest, the most ignorant, and the most destitute families from divers parts of England, and largely from Ireland, tempted by the prospect of constant employment and wages which are to them affluence. The situation of the city presents great difficulties in the way of a satisfactory system of house and street drainage. The inevitable result of a large, crowded, dirty, ignorant, and too often, much drinking, ill fed population, is disease and death. The death-rate of Manchester is the highest in England—four degrees higher than even that of Liverpool. It is quite certain that if the sanitary machinery of Manchester could be made equal to that of London, and that if the Corporation of Manchester would place the sanitary arrangements under the control of an officer of health and an engineer who would work as harmoniously and as vigorously together as Dr. Letheby and Mr. Haywood do, the death-rate might be sensibly diminished, to the great benefit of the ratepayers, to say the very least. But it must be remembered that the officer of health and the engineer of the City of London have grown by degrees to their present positions and influence, and are able to resist the many attempts to reduce them to humble dependents on a quarterly salary. In Manchester—that city which, according to the opinion of its leading political orators, ought to improve the tone of all legislators—it was only the other day that, after much pressure, the Corporation determined to appoint an officer of health, at the very moderate salary of £500 a year. An officer whose duty it will be to call attention in a very decided manner to evils that are the accumulated result of years of neglect and defiance of the laws of sanitary science, or rather sanitary Acts, for it has not yet reached the exactness of science, to be of any use, must have not only the necessary practical and scientific experience, but the mental and physical energy necessary for creating an entirely new department, to walk side by side with, and often direct, the police arrangements, in spite of local obstruction and the opposition of private and individual interests. But the dirt and do-nothing interest appears to be as strong in Manchester as if it were one of the oldest and rottenest of municipal boroughs, instead of being the nursing mother of extreme Radicalism. The attempt "to secure a more intelligent and "scientific administration of the sanitary regulations within "the city, and reduce the death-rate, now in excess of that in "any other large community in the kingdom, by appointing a "public officer of health," was first evaded as long as possible, and then carried out, if we may believe the testimony of the local journals of all shades of political opinion, in the manner the least likely to be troublesome to the dirt and do-nothing interest. The Corporation began, after a failure in an attempt to appoint without competition a man after their own heart, by issuing an advertisement, which included with medical men, who alone can be qualified for officers of health, "other persons"—that is, half-pay officers, police inspectors, and ex-masters of workhouses. Finally, the choice was reduced to a Dr. Reed, a gentleman in the prime of life, with unusual scientific and personal qualifications, and a Mr. Leigh, a middle-aged gentleman, already and for many years in the employment of the gas department of the Corporation—an accomplished chemist, desirous of retiring from the anxiety of private practice, and willing to devote his *spare* hours to the organization of a health department for Manchester. It seems that his amiable, pliant, and submissive disposition made him from the first the favourite of the party in the council who desire the least possible interference with present arrangements. For this triumph of mediocrity over vigorous intelligence the sanitary sensational writers are not a little responsible.

Mr. Dodson's attempt to simplify the practice in parliamentary private Bill legislation, by only hearing one side, has been a failure, although he could have fortified himself with a long string of precedents, beginning with King James the First, on his first and only attempt to sit as judge in the Court of King's Bench. There is nothing more confusing or more fatiguing than hearing two sides of a question, both ably argued. We should not think of maintaining that our system of private Bill legislation is perfect, or even that it would not bear a great deal of amending; but before Parliament admits of any change, it will be well to ascertain that the alteration is an improvement. Reform and change are not synonymous terms. We never heard that Mr. Dodson, who is a squire by position and a lawyer by education, was a member of the Peace Society, but he has framed his failure on Peace Society's principles. This society proposed, in the good times of the Emperor Nicholas, to secure the peace of Europe and the safety of Great Britain by disbanding the British army, on the theory that if there was no resistance there would be no fighting. Parliament, considering that there were many instances in which competition in public works might not be for the advantage of the public, enacted, by Standing Order No. 131, that "It shall be competent to "the Referees on Private Bills to admit petitioners to be heard "on the ground of competition if they shall think fit." Mr. Dodson proposed to repeal this Standing Order, and replace it by one "giving the proprietors of existing works powers to "be heard upon petition against a private Bill relating to "similar works within a town or district served by them, on the "ground of absence of public advantage." But the House was not inclined to cast further discouragement on a class of investments which in other countries are a reason for taxation, and here cost the country nothing. The motion was lost without a division; and, had it gone to a vote, our *doctrinaire* lawyer would have been beaten by two to one.

The *Grocer*, that admirable newspaper representative of the *Epicier*, cannot imagine why we, who write chiefly for the shareholders in gas companies and the makers of gas, should venture to treat on grocery, without the indispensable "seven "years apprenticeship" required to sympathize with the griefs of the retailers of mustard, pepper, tea, and coffee. Unfortunately or fortunately our readers are only men and women, who drink tea and coffee, and suffer from chicory in coffee, from flour in mustard, and heavy overcharges which are made to pay for sugar sold at a loss, for perquisites to the housekeeper, and for poundage to the butler when he pays the bills; so we write for our customers amusement and instruction, and are happy to see, from the *Grocer's* remarks, with some success. We do not read the *Grocer* regularly, or require its "speeches for "the prisoner" to tell us that a very active trade in chicory for coffee, flour for mustard, sprats for anchovies, poison for pickles and cayenne, and husks for black pepper, and other ingenious adulterations, were checked, though not crushed, by the *Lancet's* articles. We can read figures and compare invoices without having been educated in an apron behind the counter, like our friend the *Grocer*, and therefore know perfectly well that gross overcharges to cash customers have been exposed and reduced since the light of the press has been turned on the doings of the West-end tradesmen, who, like ancient Pistol, have cursed, but have, nevertheless, had to eat their leek. In the indignant number of the *Grocer*, the editor has quoted from another trade paper a denunciation of "cheap "shag tobacco," which he terms "a delusion." The saving, he tells us, "comes out of the watering-pot;" and he goes on to appeal, not to the honesty, but the self-interest of the dealer, by showing that "shag" sold under price does "not pay in "the long run." Could the warmest supporter of co-operative stores say anything more damaging of shopkeeping morality? We may usefully add, for the information of smoking friends, that the "stores" do not sell "cheap shag," and that their cigars are undeniably first-rate.

An unexpected result of co-operative competition has been the development of a taste for art, if not fine art, amongst the injured innocents of the counter. A series of caricatures have been issued under their especial patronage, amongst others a series of tea-wrappers, which are supposed to exhibit the results of a woman purchasing her tea at a public-house. This is quite fair, and fun is always acceptable, although nothing less than equal weight and equal quality will beat the red-wrappered article of the licensed victualler. When Mr. Gladstone first proposed to break in on the publicans monopoly, the *Morning Advertiser* threatened us with the deterioration of confectioners shops—the probability of a man finding his wife drunk after a debauch of tarts and cheap sherry, while

his daughter found her ruin in the baker's attic and Gladstone claret. But the pathetic picture did not stop the Bill any more than the protest of our butcher stopped a neighbouring grocer from dealing in dairy-fed pork and Ostend rabbits. No doubt the butcher's newspaper could say something very severe on this desecration of the tea-shop; but, meantime, the public stand by, laugh, and win by the results of free competition, rejoicing that trades are not allowed to make laws for each other.

Mr. George Greaves, the medical officer of the Salford Union, Manchester, has lately published a little work, entitled "Hints to Certifying Surgeons under the "Factory Acts," which will be of additional value now that the restrictions on the employment of boys and girls have been extended to so many employments. The most important duty of the certifying surgeon is to protect children and young persons from working before the period and beyond the hours allowed by law. It is his duty, as far as he can, to ascertain the age of those submitted to his opinion, and also to decide "whether there are such indications of disease or bodily "infirmity as to disqualify the person for the time from "working for the time permitted by the law." It is a curious fact that, so late as the year 1835, nothing was known of the physical signs of age. Mr. Greaves quotes the following passage from the celebrated M. Quetelet's work, "*Sur "l'Homme*":—"To show how little advanced is the study "of the physical development of man, if we were required to "determine the age of an individual by the whole of his "physical qualities, we should not obtain from science the "means of answering the question, and our attempts at its "solution would be fearfully empirical." When the first Factory Act was passed, in 1833, it was proposed to employ height as a test of age. This soon failed: the stout short ones were rejected, the tall slim ones were set to work too hard for them. Next the measurement of the trunk was tried, and found equally fallacious. Some experiments were also made to use the tests of weight and of muscular development. The examination was a farce, or an "*empirisme "effrayant*," as M. Quetelet termed it, until Mr. Edwin Saunders proposed an examination of the degree of development of the second or permanent teeth as a test. This is now universally employed. This test has the advantage that in the case of slightly retarded development the age of the person would be under estimated, and no harm could ensue, while cases of premature development are extremely rare, and, where they occur, are generally accompanied by a corresponding increase of strength. Mr. Greaves gives very minute instructions for the examination of the teeth, for which we refer to the original pamphlet. It must be noted that the law knows nothing of the "teeth" or any other test. The surgeon "certifies that the child or young person pre-"sented for examination has the ordinary strength and "appearance of the required age. He must, therefore, mark "the degree of development of the muscles and bones, and "the expression of the countenance." Mr. Greaves warns surgeons against refusing a certificate where apparent infirmity, paleness, and emaciation may be simply from the want of the wholesome food which wages will supply. "Refusal of employment in such cases almost amounts to "a sentence of slow starvation. Employment in a warm, "well-ventilated factory, in some work not too laborious, is "far more likely to recover strength than when wandering "about the streets, or sitting hungry and hopeless in his "comfortless and fireless home." This last extract shows the common sense of Mr. Greaves—a qualification in which some very scientific men are sadly deficient.

Circular to Gas Companies.

The second reading of Mr. Morrison's Metropolis Gas Bill, which was appointed for Friday last, has been deferred to this evening; and it will be strongly opposed unless its promoters consent to withdraw the compulsory powers to purchase conferred by the 5th, 6th, and 7th clauses of the Bill. The first of those clauses provides that "At any time after the passing "of this Act the Metropolitan Board of Works or the Com-"missioners of Sewers may purchase from any company the "undertaking of the company." By the second clause, however, the power of compulsory purchase is limited to within six months after the passing of the Act, and, in case either of the authorities named give notice of their intention to purchase within that period, the consideration and terms of purchase, in default of agreement, are to be fixed by an arbitrator, to be appointed by the Board of Trade on the application of either party; such application to be made not later than one month after the first period of six months. On those conditions being complied with, the third clause provides that the sale by a company of their undertaking is to be carried into effect on the execution of a deed of transfer. To bestow such peremptory powers of purchase on the local authorities, who, directly or indirectly, have, by their continued agitation, greatly depreciated the value of shares in the metropolitan gas companies, would be little less than an act of spoliation; and we trust that all who are interested in the protection of the rights of property will unite to resist the perpetration of such injustice. Should the Bill be read a second time, it would be referred to the same committee as the London Corporation Bill and the Bills of the Imperial and Chartered Companies, the members of which committee are not yet named.

It is satisfactory to find that the opposition to Mr. Dodson's threatened interference with the present system of private Bill legislation, to facilitate the establishment of competing companies, has proved too powerful to permit him to carry his proposed alterations in the Standing Orders of the House of Commons, and that he has accordingly withdrawn his resolutions. It remains to be seen whether he will, after this rebuff, persist in his scheme for investing the Board of Trade with power to authorize the establishment of new gas and water companies, on proof of the consent of the local authorities of the district. The continued threatened interferences with private enterprise in this country are producing the effect that might be expected, of indisposing capitalists to embark in such undertakings at home, and are driving them to enter into speculations in foreign countries, where the rights of property are held more sacred.

The letter of Mr. Innes, the engineer of the Phœnix Gas Company, inserted in another column, in explanation of the evidence he gave before the arbitrators in the case of the valuation of the Weymouth Gas-Works, relieves us from the necessity of pointing out the discrepancies between it and the evidence he gave before a committee of the House of Lords on the Phœnix Company's Bill in 1864; but it leaves untouched the novel system of valuing gas property which he proposed, and which cannot be too strongly protested against. In the opinion of Mr. Innes it is a fair method of estimating the value of a gas undertaking to add the net profits of three years to the structural value of the works; and when, in his cross-examination, that principle of valuation was applied to the works of the Phœnix Company, and he was asked whether he would accept three years net profits in addition to the structural value, he is reported to have said "it would be very liberal payment." According to this notion of Mr. Innes, a gas company that had material value in works for every shilling of capital raised would only be entitled to 30 per cent. premium for the goodwill of their trade, and those companies which had not material value to show for their whole capital would be mulct to the amount of the deficiency. Taking his own company as an illustration of what would be the operation of such a principle of valuation, we are assured, on the very best authority, that it would have given only £694,000 as the value of the Phœnix Company's works in 1863, while their commercial value was £1,325,000 at the then current value of their shares. His method of estimating structural value was equally objectionable. Without having seen the Weymouth Gas-Works, and without having ever been in the town, Mr. Innes commenced his valuation by assuming that £4 per ton of coal carbonized was sufficient capital for a gas-work of the size and description of that at Weymouth, though more than half that amount had been expended in constructing a tunnel under a deep tidal channel, the inhabitants having objected, at the time the works were constructed, to their being built on the town side of the harbour. Less than £2 per ton of coal carbonized would consequently be left for the estimated cost of works on which the owner stated he had expended £29,000, for a consumption of not more than 2240 tons of coal per annum, or a fraction less than £13 per ton, though it is probable that the expenditure included some losses sustained in the earlier years of the undertaking, during which it was unproductive. The exceptional case of Mr. Innes's own company should have warned him against the adoption of such a crude mode of valuation, for he admitted that, owing to extraordinary expenditure on works not yet profitable, the capital of

the Phœnix Company was only fairly represented by £8 10s. of coal carbonized; and it is unquestionable that £4 per ton is, in ordinary cases, far below the average expenditure on works similarly situated and of similar capacity to the gas-works at Weymouth. The award of £26,350 is, perhaps, as much as could have been expected under the circumstance that no books could be produced to support the vendor's estimate of the profits. This case gives additional validity to the correctness of the commercial principle of valuation, clearly explained by Mr. Hawksley, of capitalizing the profits on the basis of 16⅔ years purchase, after making adequate allowance for interest on working capital, and for renewals and depreciation. The directors of gas companies may also learn, from the proceedings before the arbitrators in the Weymouth case, that it is not prudent to permit their officers to give evidence in contested matters in which their companies have no interest, as there is no limit to the extent to which cross-examination may be pushed. Mr. Innes had no intention of entering into the details respecting the £144,000 of capitalized profits of the Phœnix Gas Company, and he failed to take advantage of the opportunity which the questions put to him by Mr. Barlow afforded of making the evidence he was giving accord with that given by him before the committee of the House of Lords and with the Bill in support of which it was given.

We noticed in our last "Circular" the unfortunate position in which the Slough Gas Company has been placed by the obstinacy of the directors and manager, and we regret to find that they have not gained wisdom by experience. Instead of setting boldly to work to mitigate if not to remove the nuisance complained of, they have applied to the Court of Chancery for an injunction to restrain the plaintiff in the action from levying execution; on the ground that they are about to present a petition for a winding-up order, under the Companies Act of 1862, in consequence of their inability to pay the claims on them, and an *ex parte* injunction has consequently been granted by the Master of the Rolls. This is, we believe, the first instance of an application to wind up the affairs of a company established by Act of Parliament, and there seems to be some difficulty in carrying it into effect. If it were determined to protect the interests of the shareholders by any such proceeding, the proper method would have been to apply for the appointment of a receiver, which course has been adopted in the cases of the bankrupt railway companies, and by that means the interruption of the public service, which the Slough Gas Company have undertaken to discharge, would have been prevented.

An unforeseen legal objection has arisen to the appointment of Mr. Hawksley as examiner of the accounts of the Wolverhampton Gas Company. The 35th section of the Gas-Works Clauses Act provides that the person appointed to examine the actual state and condition of the concerns of a gas company, with a view to ascertain the amount of profits of the undertaking, shall be "some accountant or other competent person, "*not being a proprietor of any gas-works;*" and the chairman of the Staffordshire Quarter Sessions, by which Mr. Hawksley was appointed, and the clerk of the peace, are both of opinion that as he is the holder of shares in other gas companies, he is disqualified from acting in that capacity. Another appointment must consequently be made at the next quarter sessions for the county.

The meeting of the City of Moscow Gas Company, which was appointed to be held on the 20th inst., and was afterwards postponed to the 27th, has been further deferred until early in May, in order to allow time for the committee of consultation to receive the report of a "well-known gas engineer," not named, who has been engaged to proceed to Moscow and examine the position of the undertaking. There appears to be no good reason for this delay, for the essential question to be solved is, whether the profits now being realized are sufficient to pay the interest on the existing debentures of the company and the interest on the preference shares proposed to be issued, amounting together to about £33,000 per annum; and it seems to us that an examination of the profit and loss account for the last year, combined with a careful consideration of the conditions of the concession, should have been sufficient for the solution of such a question. No one doubts that magnificent gas-works have been erected in Moscow, fully equal to every probable requirement of that city, and if there be a reasonable prospect that the profits will be sufficient to pay the interest on the proposed issue of preference shares they would be speedily absorbed by the public. A profit and loss account speaks more convincingly than any speculative report of an engineer, however experienced and practical he may be; and the shareholders of this disastrous undertaking have been too long buoyed up with unreal expectations to place much faith in any representations not based on solid facts.

A supplementary report on the coal production of foreign countries and of the British colonies, recently presented to Parliament, gives a brief account of the bituminous deposits of Trinidad, which island is abundantly rich in such deposits; and attention has been directed to it as a source of supply for the manufacture of highly illuminating gas, to make up for the increasing deficiency in the supply of cannel. In addition to the asphalte, known in this country as "Trinidad pitch," there are stated to be "many beds of shale in the tertiary series "which are rich in asphalte minerals, and would probably "yield an ample reward to distillation. Some of these shales "will burn like coal, and could, indeed, be used as such were "it not for the very large proportion of residue left after their "combustion. One highly probable use of the asphalte would "be in the production of gas for illumination; but, as there "are no gas-works in the island, this has not been practically "tried, though suggested many years ago." This report, which is signed by Mr. Guppy, a fellow of the Geological Society, is dated in February last year. The richest coal deposits of Trinidad are at present almost inaccessible, from the want of roads and good harbours; but, if the parliamentary requirement that gas must be supplied of increased illuminating power be extended, regardless of the limited beds of British cannel, the bituminous shales and asphalte of Trinidad might be rendered available.

We have been so long accustomed to representations of the baneful effects of sulphurous fumes in destroying property and injuring health, that it is pleasant to look on the other side of the picture, and see there exhibited in glowing colours the virtues of sulphur as a panacea for the cure of most diseases that flesh is heir to. This obverse is shown in a pamphlet that has been sent to us, written by Mr. Pairman, a surgeon at Biggar, in Scotland, which has reached a twelfth edition, entitled "The Great Sulphur Cure brought to the Test;" and the cases adduced of cures effected by sulphurous fumigation are well attested and confirmed by the opinions of several distinguished chemists and medical men. A preface to the publication, written by the Rev. J. Christison, the minister of Biggar, and brother of the celebrated chemist of that name, affirms his confident belief in the great efficacy of sulphur, and states he has witnessed in his own parish several cases of cure by the sulphur treatment, in some of which the patients seem "as if they had been cured by magic." Among those who give testimony to the curative virtues of sulphur is Dr. Lyon Playfair, who says: "Sulphurous acid seems to act in two "ways—first, by killing fungi and infusoria; and, secondly, "by producing ozone during its own oxidation in the air." This pamphlet only professes to be an off-shoot from another one by Dr. Dewar, who originated in recent times this curative system, which, like most other things, is but a revival of former practices, Dr. Sir Arthur Clarke having applied sulphur fumigation with great success for the restoration of health at the beginning of the present century; and the use of sulphur as a disinfectant is traced even to the days of Ulysses! The facetious vein in which Mr. Pairman's pamphlet is written—for the purpose, as he says, of exciting attention—detracts from its merit as a serious exposition of facts; but he is evidently confident of the great efficacy of sulphurous fumes in the treatment of numerous diseases, and he fully intends that his writing in sport should be made practice in earnest.

Many of our oldest subscribers have urged on us the expediency of publishing a digest of the contents of the JOURNAL OF GAS LIGHTING from its foundation, in the form of a copious index, giving an abstract of all the matters contained in the first sixteen volumes, so arranged that everything which has appeared on any given subject may be at once referred to. The cost and labour of such a work would, of course, be very heavy, as it would occupy the space of about one entire volume, but if 250 copies, at the price of two guineas each, are subscribed for, we are prepared to undertake the risk of such a publication. Those readers of the JOURNAL who desire to possess the proposed catalogue *raisonné* of its contents from 1849 to 1867 inclusive, will oblige us by sending their names as subscribers to the publisher, Mr. King, 11, Bolt Court, Fleet Street, E.C.

Communicated Article.

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EXPERIMENTS ON THE FLOW OF GAS IN LONG PIPES,
MADE IN THE WORKS OF THE PARIS GAS COMPANY.

(*Continued from page* 180.)

Tables.

In the practice of the industrial arts, simplicity is of so much importance that formulæ, however exact, are often advantageously replaced by tables; and for this reason tables have been prepared of the flow of gas according to the principles laid down in this paper.

In preparing these tables, it is important to simplify, as much as possible, the formula applied. It will be seen that, by considering the gas as inexpansible, the expressions are much simplified, while the errors induced by the change are very small.

Reverting to equation (8), and causing to disappear the term due to the elasticity of the gas, we have—

$$\frac{4L}{D} bv^2 = \frac{K}{2}\left[1 - \left(\frac{P_1}{P_0}\right)^2\right] - \frac{4L}{D} av \frac{P_0 + P_1}{2P_0};$$

or making

$$P_1 = P_0 - p,$$

$$\frac{4L}{D} bv^2 = \frac{K}{2}\left[\frac{2p}{P_0} - \frac{p^2}{P_0^2}\right] - \frac{4L}{D} av\left(1 - \frac{p}{2P^0}\right);$$

and remarking that the terms $\frac{p^2}{P_0^2}$ and $\frac{p}{2P_0}$ are very small in respect to the positive terms from which they are to be subtracted, we may, without sensible error, reduce the formula to

$$\frac{4L}{D}(av + bv^2) = \frac{Kp}{P_0},$$

whence

$$p = \frac{4L}{D}\pi(av + bv^2). \qquad (13)$$

[In which L = length of pipe in mètres.
D = diameter of pipe in mètres.
π = weight in kilogrammes of 1 cubic mètre of the fluid.
v = velocity in mètres per second.
p = loss of pressure, expressed in kilogrammes per square mètre.
a and b, coefficients varying with the diameter and the material, as above stated.]

It is by means of this formula (13) that the loss of pressure in the annexed tables has been calculated.

In the first place the *volumes* discharged have been taken as data; from these the *velocity* has been calculated, and then the loss of pressure.

This has been calculated for air at a unit of density, and for gas suitable for illumination, taken at a specific gravity of 0·41. This figure is the mean of 12 observations, made on the gas of ordinary make, as delivered for consumption.

Finally, the tables have been prepared for the flow in a pipe of 1000 mètres (1093 yards) in length, and the loss of head corresponding to any other length will be obtained by a proportional calculation.

Experiments on the Flow of Gas in Long Pipes, made at the Works of St. Mandé and La Villette, 1863-1864.

Experiments of November 5, 1863.—*Diameter,* 0·250 *Mètres.—Conduit, Cast Iron.—Length of Conduit,* 268 *Mètres.*

Number of Experiment.	Hours of Observation.	Duration of Experiment.	Readings of Meter in Cubic Mètres.	Volumes V flowing in Cub. Mètres. Total.	Per Second.	Volumes flowing *Vo* in Cub. Mètres p. Sec.	Mean Velocities *Uo* in Mètres per Second.	Temperatures of the Fluid in Degrees Centigrade. At the Origin, T_0.	At the End, T_1.	Mean $\frac{T_0+T_1}{2}$	Pressures by Manometer, in Mètres of Water. At the Origin.	At the End.	Loss of Pressure in Mètres of Water.	Barometric Observations in Mètres and in Degrees Centigrade. Temp. of the Barometer.	Coefficients of Correction.	Height read of the Mercury.	Equivalent Heights of Water.	Weight of Fluid in Kilogrammes.	Loss of Pressure transferred to 0°, and to the Press. 0m·76, in Mètres.	Observations.
8	3·30	Min	871					14·	12·5		0·1350	0·0737		12·5		0·7695				
	3·35		971					13·7			0·1350	0·0738		12·4						
	3·40		1076					13·7			0·1354	0·0738		12·4						
	3·45	15	1171	·300	0·33333	0·3321	6·554	13·7		13·1	0·1350	0·0730	0·0616	12·4	13·56345		10·4336	1·258	0·0632	
9	3·50		1248					13·7	12·5		0·1090	0·0800		12·5		0·7695				
	3·55		1335					13·5			0·1104	0·0604		12·						
	4·00		1421					13·5			0·1102	0·0609		12·						
	4·05	15	1507	·239	0·28777	0·2850	5·626	13·5		13·	0·1106	0·0609	0·0495	12·	13·56643		10·4392	1·256	0·0509	
10	4·10		1547					13·2	12·5		0·0583	0·0325		12·		0·7693				
	4·15		1598					13·			0·0584	0·0326								
	4·20		1647					13·			0·0584	0·0329								
	4·25	15	1692	·145	0·16111	0·1605	3·168	13·		12·7	0·0584	0·0328	0·0257		13·56643		10·4396	1·253	0·0265	
11	4·30		1723					13·	12·5		0·0260	0·0167		12·		0·7693				
	4·35		1751								0·0260	0·0168								
	4·40		1875								0·0255	0·0167								
	4·45	15	1811	·88	0·09777	0·09777	1·929			12·7	0·0255	0·0165	0·0090		13·56643		10·4366	1·256	0·0093	
12	4·50		1844					13·	11·5		0·0919	0·0495		11·5		0·7693				
	4·55		1900								0·0920	0·0518								
	5·00		1953								0·0921	0·0505								
	5·05	15	2008	·164	0·18222	0·1816	3·585			12·2	0·0921	0·0505	0·0415		13·56765		10·4356	1·253	0·0426	

Experiments of November 2, 1863.—*Diameter,* 0·103 *Mètres.—Conduit, Cast Iron.—Length of Conduit,* 286 *Mètres.*

1	3·30	Min	9870·7					11·5	9·		0·1186	0·0098		9·5		0·7414				
	3·35		9878·								0·1182	0·0080		9·5		0·7414				
	3·40		9886·8								0·1180	0·0080		9·5		0·7414				
	3·45		9895·3								0·1176	0·0084		9·5		0·7414				
	3·50	20	9898·8	28·1	0·0234	0·02334	2·790			10·2	0·1180	0·0084	0·1096	9·5	13·57256	0·7414	10·0627	1·221	0·1160	Experiments made with air.
2	4·00	10	9903·5					10·5	8·		0·0420	0·0070		8·5		0·7412				
	4·05		9907·0					10·	8·		0·0403	0·0059		8·		0·7412				
	4·10		9911·5	8·	0·0133	0·01334	1·602	10·	7·5	9·	0·0403	0·0070	0·0344	8·	13·57577	0·7412	10·0623	1·222	0·0364	

Experiments of November 3, 1863.—*Diameter,* 0·103 *Mètres.—Conduit, Cast Iron.—Length of Conduit,* 268 *Mètres.*

3	10·51	Min	9932·					11·5	10·		0·1416	0·0090		9·5		0·7612				
	10·55		9940·					11·5	9·5		0·1413	0·0092		9·5		0·7612				
	11·00		9951·7					11·5	9·5		0·1412	0·0090		9·5		0·7612				
	11·05	14	9960·	28·	0·0333	0·0330	3·061	11·5	9·5	10·5	0·1410	0·0092	0·1322	9·5	13·57256	0·7612	10·3314	1·253	0·1363	
4	11·10		9968·7					11·5	9·5		0·1002	0·0070		9·4		0·7612				
	11·15		9976·4					11·5	9·5		0·0992	0·0071		9·4		0·7612				
	11·20		9984·5					11·5	9·5		0·0997	0·0080		9·4		0·7612				
	11·25	15	9993·	24·3	0·027	0·02685	3·223	11·5	9·5	10·5	0·1005	0·0080	0·0924	9·4	13·57281	0·7612	10·3316	1·251	0·0955	
5	11·30		9999·9					11·5	9·5		0·0630	0·0065		9·5		0·7612				
	11·35		10005·6					11·5	9·5		0·0630	0·0064		9·5		0·7612				
	11·40		10011·0					11·5	9·8		0·0635	0·0064		9·5		0·7612				
	11·45	15	10016·8	16·9	0·01877	0·01877	2·248	11·5	10·	10·6	0·0635	0·0080	0·0564	9·5	13·57256	0·7612	10·3314	1·248	0·0589	
6	11·50		10019·4					11·5	10·		0·0295	0·0050		9·5		0·7612				
	11·55		10022·0					11·5	10·		0·0300	0·0052		9·5		0·7612				
	12·00		10025·5					11·5	10·		0·0310	0·0055		9·5		0·7612				
	12·05	15	10027·8	8·4	0·00933	0·00933	1·120	11·5	10·	10·7	0·0295	0·0054	0·0247	9·5	13·57256	0·7612	10·3314	1·246	0·0236	
7	12·10		10033·6					11·5	10·		0·0776	0·0064		9·5		0·7612				
	12·15		10040·2					11·5	10·		0·0778	0·0064		9·5		0·7612				
	12·20		10047·0					11·5	10·		0·0780	0·0070		9·5		0·7612				
	12·25	15	10053·9	20·3	0·02255	0·02245	2·695	11·5	10·	10·7	0·0775	0·0080	0·0708	9·5	13·57256	0·7612	10·3314	1·249	0·0733	

Experiments made with air.

Experiments of March 14, 1864.—*Diameter*, 0·081 *Mètres.*—*Conduit, Cast Iron.*—*Length of Conduit*, 113 *Mètres.*

Number of Experiment.	Hours of Observation.	Duration of Experiment.	Readings of Meter in Cubic Mètres.	Volumes V flowing in Cub. Mètres. Total.	Per Second.	Volumes flowing Vo in Cub. Mètres p. Sec.	Mean Velocities Vo in Mètres per Second.	Temperatures of the Fluid in Degrees Centigrade. At the Origin, T_o.	At the End, T_1.	Mean $\frac{T_o+T_1}{2}$	Pressures by Manometer, in Mètres of Water. At the Origin.	At the End.	Loss of Pressure in Mètres of Water.	Barometric Observations in Mètres and in Degrees Centigrade. Temp. of the Barometer.	Coefficients of Correction.	Heightsread of the Mercury.	Equivalent Heights of Water.	Weight of Fluid in Kilogrammes.	Loss of Pressure transferred to 0°, and to the Press. 0m·76, in Mètres.	Observations.
18	2·05	Min	2·400					11·	12·5		0·0890	0·0663		13·		0·7654				
	2·10		8·700					10·7	12·5		0·0890	0·0665		13·		0·7654				
	2·15		14·800					10·5	12·5		0·0891	0·0664		13·		0·7654				
	2·20	15	20·800	18·400	0·020444	0·020331	3·945	10·5	12·5	11·6	0·0890	0·0664	0·0226	13·	13·56398	0·7654	10·3819	0·509	0·0233	Experiments made with coal gas having a density equal to 0·407 of that of air at 0°, and with a pressure of 0·76.
19	2·25		3·600					11·5	13·2		0·0451	0·0428		13·		0·7654				
	2·30		4·320					11·5	13·2		0·0452	0·0424		13·		0·7654				
	2·35		5·240					11·7	13·2		0·0455	0·0424		13·		0·7654				
	2·40	15	5·820	2·220	0·002466	0·002459	0·477	11·7	13·2	12·4	0·0454	0·0426	0·0028	13·	13·56398	0·7654	10·3819	0·506	0·0029	
20	2·45		6·430					11·	13·		0·0615	0·0512		13·5		0·7653				
	2·50		4·800					11·	13·		0·0615	0·0508		13·5		0·7653				
	2·55		7·700					11·	13·		0·0615	0·0508		13·5		0·7653				
	3·00	15	11·300	10·870	0·012077	0·012027	2·334	11·7	13·	12·1	0·0609	0·0508	0·0104	13·5	13·56278	0·7653	10·3796	0·507	0·0105	
21	3·05		1·600					11·3	13·		0·0510	0·0456		13·5		0·7653				
	3·10		3·730					11·	13·		0·0508	0·0458		13·5		0·7653				
	3·15		5·880					11·	13·		0·0504	0·0450		13·5		0·7653				
	3·20	15	8·000	6·400	0·007111	0·007083	1·374	11·	13·	12·1	0·0508	0·0454	0·0053	13·5	13·56278	0·7653	10·3796	0·507	0·0056	
22	3·25		1·320					12·	13·2		0·0461	0·0430		13·		0·7650				
	3·30		2·260					12·	13·2		0·0463	0·0431		13·		0·7650				
	3·35		3·200					12·	13·2		0·0456	0·0429		13·		0·7650				
	3·40	15	4·160	2·840	0·003155	0·003146	0·610	11·7	13·2	12·5	0·0457	0·0430	0·0029	13·	13·56398	0·7650	10·3764	0·504	0·0030	

Experiments of March 18, 1864.—*Diameter*, 0·081 *Mètres.*—*Conduit, Cast Iron.*—*Length of Conduit*, 113 *Mètres.*

23	1·55	Min	3·200					16·	11·		0·0480	0·0433		15·5		0·7526				
	2·00		5·240					16·	11·		0·0480	0·0430		15·5		0·7526				
	2·05		7·300					16·	11·		0·0480	0·0431		15·5		0·7526				
	2·10	15	9·300	6·100	0·006777	0·006715	1·303	16·	11·	13·5	0·0475	0·0430	0·048	15·5	13·55785	0·7526	10·2636	0·496	0·0050	Experiments made with coal gas having a density equal to 0·407 of that of air at 0°, and with a pressure of 0·76.
24	2·15		1·400					14·	11·		0·0665	0·0528		14·8		0·7523				
	2·20		6·600					14·	11·		0·0661	0·0530		14·8		0·7523				
	2·25		10·100					13·5	11·		0·0662	0·0526		14·8		0·7523				
	2·30	15	14·480	13·080	0·014530	0·014548	2·804	13·5	11·	12·4	0·0660	0·0528	0·134	14·8	13·55957	0·7523	10·2008	0·498	0·0141	
25	2·35		1·480					14·	11·		0·0503	0·0444		14·8		0·7523				
	2·40		4·080					14·	11·		0·0500	0·0442		14·8		0·7523				
	2·45		6·600					14·	11·		0·0501	0·0444		14·8		0·7523				
	2·50	15	9·200	7·720	0·008577	0·008528	1·655	14·	11·	12·5	0·0501	0·0448	0·057	14·8	13·55957	0·7523	10·2008	0·498	0·0060	
26	3·00		3·120					17·	11·5		0·0440	0·0406		14·8		0·7523				
	3·05		4·520					17·	11·5		0·0439	0·0408		14·8		0·7523				
	3·10		5·700					17·	11·5		0·0438	0·0408		14·8		0·7523				
	3·15	15	6·880	3·760	0·004177	0·004136	0·802	17·	11·5	14·2	0·0434	0·0408	0·030	14·8	13·55957	0·7523	10·2008	0·494	0·0032	
27	3·20		0·640					14·	11·5		0·0470	0·0424		14·5		0·7522				
	3·25		2·620					14·	11·5		0·0470	0·0422		14·5		0·7522				
	3·30		4·660					13·	11·5		0·0474	0·0423		14·5		0·7522				
	3·35	15	6·660	6·020	0·006688	0·006647	1·290	13·	11·5	12·5	0·0469	0·0425	0·048	14·5	13·56030	0·7522	10·2000	0·498	0·0050	

Experiments of March 23, 1864.—*Diameter*, 0·050 *Mètres.*—*Conduit, Cast Iron.*—*Length of Conduit*, 113 *Mètres.*

28	2·20	Min	1·840					15·5	13·5		0·1040	0·0448		·15		0·7523				
	2 25		4·240					15·5	13·5		0·1035	0·0446								
	2·30		6·640					15·	13·2		0·1041	0·0446								
	2·35	15	9·080	7·240	0·008044	0·008051	4·100	15·	13·2	14·2	0·1037	0·0446	0·0592		13·55908		10·2005	0·496	0·0628	Experiments made with coal gas having a density equal to 0·407 of that of air at 0°, and with a pressure of 0·76.
29	2·40		2·800					14·5	13·2		0·0656	0·0410		·15		0·7523				
	2·45		4·240					14·7			0·0645	0·0409								
	2·50		5·660					14·7			0·0645	0·0410								
	2·55	15	7·100	4·300	0·004777	0·004784	2·437	14·7		13·5	0·0650	0·0404	0·0241		13·55908		10·2005	0·497	0·0256	
30	3·00		1·600					14·	13·		0·1150	0·0456		·15		0·7523				
	3·05		4·260					14·			0·1142	0·0458								
	3·10		6·880					13·5			0·1149	0·0458								
	3·15	15	9·560	7·960	0·008844	0·008806	4·485	13·5		13·3	0·1152	0·0452	0·0692		13·55908		10·2005	0·496	0·0730	
31	3·20		3·760					13·5	13·		0·0750	0·0416		14·8		0·7523				
	3·25		5·540								0·0755	0·0417								
	3·30		7·320								0·0759	0·0417								
	3·35	15	9·100	5·340	0·005933	0·005924	3·017			13·2	0·0764	0·0424	0·0339		13·55957		10·2008	0·496	0·0358	
32	3·40		3·060					13·5	13·		0·0880	0·0436		14·5		0·7523				
	3·45		5·140								0·0878	0·0432								
	3·50		7·200								0·0876	0·0432								
	3·55	15	9·300	6·240	0·006933	0·006915	3·522			13·2	0·0870	0·0428	0·0444		13·56030		10·2014	0·496	0·0469	

Experiments of May 10, 1864.—*Diameter*, 0·050 *Mètres.*—*Conduit, Tin.*—*Length of Conduit*, 50 *Mètres.*

33	1·10	Min	2·440					13·5	13·	13·2	0·0765	0·0506		11·5		0·7564				
	1·15		5·520					13·5	13·	13·2	0·0766	0·0505		11·5						
	1·20		8·560					13·5	13·	13·2	0·0767	0·0506		11·5						
	1·25	15	11·600	9·160	0·010177	0·010141	5·165	13·5	13·	13·2	0·0768	0·0507	0·0261	11·5	13·56765		10·2625	0·500	0·0274	Experiments made on a tin conduit with coal gas of a density of 0·407 (air being 0°), and with a pressure of 0·76.
34	1·30		2·280					13·5	13·	13·2	0·0642	0·0470		12·		0·7564				
	1·35		5·540					13·5	13·	13·2	0·0644	0·0471		12·						
	1·40		7·040					13·5	13·	13·2	0·0650	0·0471		12·						
	1·45	15	9·520	7·240	0·008044	0·008021	4·085	13·5	13·	13·2	0·0652	0·0470	0·0176	12·	13·56643		10·2616	0·499	0·0185	
35	1·50		3·720					13·5	13·	13·2	0·0522	0·0428		11·8		0·7563				
	1·55		5·000					13·5	13·	13·2	0·0522	0·0428		11·8						
	2·00		6·480					13·5	13·	13·2	0·0522	0·0426		11·8						
	2·05	15	8·000	4·280	0·004755	0·004746	2·417	13·5	13·	13·2	0·0514	0·0422	0·0096	11·8	13·56692		10·2606	0·499	0·0100	
36	2·12		1·740					13·5	13·	13·2	0·0459	0·0410		11·5		0·7563				
	2·18		2·540					13·5	13·	13·2	0·0464	0·0410		11·5						
	2·22		3·240					13·5	13·	13·2	0·0463	0·0410		11·5						
	2·27	15	4·160	2·360	0·002622	0·002618	1·333	13·5	13·	13·2	0·0465	0·0410	0·0053	11·5	13·56765		10·2612	0·499	0·0055	

(*To be continued.*)

Correspondence.

MR. INNES'S EVIDENCE ON THE WEYMOUTH GAS ARBITRATION.

SIR,—I have seen your observations in the JOURNAL of March 16th, referring to some observations made by me in reply to questions from Mr. Barlow on the Weymouth gas arbitration.

The answers, or questions, have created some ambiguity with you as to the principles and practice which have for many years guided the directors of the Phœnix Gas Company, in providing and applying the capital raised for the enlargement and extension of their plant property, as distinguished from the funds provided for the renewal and maintenance of their works.

As your remarks in the JOURNAL OF GAS LIGHTING of the 16th have been published, I trust you will afford equal publicity to my more specific statement on the practice of the affairs referred to, and particularly on the application of the undivided profits from 1831 to 1860.

The Phœnix Gas Company was established by Act of Parliament in 1824, with powers to raise a capital of £540,000, and from the profits realized by the sale of gas and the products of gas manufacture, to divide amongst the proprietors or shareholders an UNLIMITED DIVIDEND, and under this Act they continued until the passing of the Metropolis Gas Act of 1860, in which, for the first time, they were placed under the restrictions of the Gas-Works Clauses Act, of the Lands Clauses Act, and by the Metropolis Gas Act, in the control of their capital and the division of their profits, their share capital being still unexhausted.

In the year 1831 a recommendation of the directors, confirmed by a general meeting, was made, by which a depreciation-fund from reserved profits, for the enlargement and extension of the company's plant property, was established, and was to be taken half yearly, by a varying per centage on the capital, out of the profits before a division was made to the shareholders, the per centage being from $\frac{1}{4}$ to 2 per cent. per annum, as the state of the profits would reasonably admit. And this sum was carried to the capital account of the company, aided at times by calls on the shareholders, and together provided the funds for the enlargement and extension of the company's plant and working capital, and continued in operation from 1831 to 1860, and during the whole of this time the average profits divided amongst the shareholders did not exceed $5\frac{1}{2}$ per cent.

In 1863 the share capital of the company was exhausted, and it became necessary to apply to Parliament for more capital and extended powers of manufacture. In 1864 their present Act was passed, and, on the representation of the directors, confirmed by the accounts of the company, that the undivided profits were added half yearly, from 1831 to 1860, to the capital, and solely used for enlargements, extensions, and increase of working capital, and that the whole amounted to £144,119, and that the shareholders did not at any time receive any profits or interest from this sum, but that it went to the aid of the capital without participating in any share of the profits—the chairman of committees on private bills, and the Lords committee, in which the bill originated, confirmed the capitalization of the sum of £144,000, at 5 per cent. interest, to be divided out of the profits of the combined capitals used by the company as a gas company.

Your remarks in reference to the answers I gave to Mr. Barlow's questions no doubt apply particularly to the capitalized profits, and as I wish to remove any doubt or ambiguity on this subject, I will thank you to consider the following as the replies intended:—

1. For renewal and maintenance, the funds are derived from current revenue, and applied out of the ordinary accounts of the company.

2. For renewal, with enlargement and extension of the plant property, the funds were derived from three sources:—For renewal, from revenue; for enlargement and extension of plant, the funds were derived from the undivided profits and from calls on the share capital.

3. For new works and land, being entirely extension, the funds were usually provided by calls on the share capital, as they were of greater extent than the reserved profits would meet.

I also referred that in many cases the three different funds were in operation on the same works, and that it was sometimes difficult to define the expenditure due to each, and it was possible some inaccuracies in the charges for renewal and enlargements would occur. As an illustration of the application of revenue and capital, at one of the works a timber-erected coal-store fell into decay; its original cost was £1200, and its capacity was 1500 tons. A new substantial coal-store was erected, with brick walls, fitted with coal railway, and covered with a substantial waterproof roof; the capacity enlarged to 5000 tons, and the whole cost £4500, of which sum revenue was charged with £1200 and plant capital with £3300.

At two of the works 13 single-lift gasholders, some with iron and some with brick tanks, were entirely renewed and made telescopic; the brick tanks were deepened; the old wood framing and pillars were replaced by cast-iron columns and wrought-iron girders. The capacity of the 13 gasholders in their old state was 500,000 cubic feet, and the cost about £20,000; the capacity of the 13 gasholders was increased by telescoping and deepening to 1,200,000 feet, and the cost about £18,000. The value of the 13 tanks remained at £7500. The cost of 13 worn-out gasholders—£12,500—containing 500,000 cubic feet, was charged to current revenue as a renewal of apparatus; while the cost of the enlarged gasholders, by telescoping in the old tanks for the increased capacity of 700,000 feet, was charged to capital at a cost of £5500, the funds being provided chiefly from the reserved profits added to capital.

A similar course was adopted with district mains, which from the year 1853 to 1859 was a very costly extension, arising from the districting arrangements of the four gas companies on the south side of London having been carried into effect at Michaelmas, 1853. The Phœnix Gas Company, in this arrangement, retained the larger portion of the town districts, where competition had at one time been most effectively carried out, and in leading streets they retained eight lines of gas-mains, with the usual complement of four separate service-pipes into each house supplied with gas. From 1853 to 1859 all this was remodelled into one leading extra-large main and two 8-inch or 10-inch mains placed near the houses for the service-pipes to supply from, with an entirely new set of services. The great expenses caused by this outlay were provided for in the mixed form, as shown for buildings and gasholders, as follows:—The whole cost of the renewal, the amount for enlargement and extension, and the amount for entirely new mains having been collected from the accounts, the plant value of the old mains and services was first deducted; and the increased cost for enlarged mains and services above the value of the plant mains was charged to the plant account, and provided for by the reserved profits added to capital, or by calls made on the shareholders; and in meters, or other capital accounts of the company, a similar course was followed until the Metropolis Gas Act of 1860 altered the powers of dealing with profits by the gas companies who were in receipt of their full rate of dividend, making any surplus profits a joint fund between the shareholders of gas-works and the consumers of gas.

My illustrations are longer than intended; but in a mixed account such as ours, where an experienced person would attribute to this company the application of capital to the renewal and maintenance of works and plant, I was desirous that as definite an explanation was given by me as would correct this view, and I trust to have fully succeeded in doing so.

There is another observation in the report, referring to the Chartered Gas Company, in which I am made to say "we," in the matter of the Chartered Gas Company's recent bill before Parliament, about capitalizing their profits. I assure you that I am not in any way in the confidence of the Chartered Gas Company either for advice or assistance; and knowing that their late bill failed from other causes more important to them than the capitalizing of their profits applied to the capital purposes of their property, I am desirous to have such an observation withdrawn as proceeding from me.

I also consider the place and time of the observations inopportune for the affairs of the Phœnix Gas Company to be discussed without notice or relevancy to the matter under investigation, and regret not having exercised the usual reserve on irrelevant matters being introduced.

With many thanks for your attention, and trusting I have only exercised such reasonable discretion as my position connected with the Phœnix Gas Company fairly dictates, I will be glad that the substance of my reply may find a place in your next JOURNAL OF GAS LIGHTING.

W. INNES,
Engineer to the Phœnix Gas Company.

Phœnix Gas Company,
70, Bankside, March, 1868.

SIR,—You have not to learn that even a talented and good man may occasionally be inaccurate or not very clear when unexpectedly required to make statements with respect to subjects which have not been for some time under his consideration.

A case of this kind is *apparent* in your number for the 17th inst. The readers of the evidence of the engineer of the Phœnix Gas Company, in the Weymouth Gas-Works arbitration case, as reported in that paper, may conclude that the £144,000 capitalized stock of the Phœnix Gas Company was not all expended in extensions and enlargements of the company's works, but such a conclusion would be erroneous.

The whole of this sum was taken from profits which might have been divided amongst the proprietors as dividend when the dividends of the company were without limitation.

It was taken by resolution of the directors, approved by general courts of proprietors, in amounts varying from £1000 to £8495 11s. year by year, with one exception, commencing in 1831 and terminating in 1860, and it was directed to be applied to the extension of the company's plant, leaving extensions of working capital found from time to time to be necessary to be provided by calling up further capital.

The total amount of profits so appropriated was £144,119 15s. 3d. and the whole was expended in extensions and enlargements of the company's plant, as shown in the following figures:—

At the close of 1830, the company had paid-up capital				£333,000 0 0
Had expended on plant	£327,188	13	9	
Leaving for working capital	5,811	6	3	
	£333,000	0	0	
As this working capital was obviously too small, a call was made, making the paid-up capital of the company				£351,000 0 0
Amount expended on plant, as before	£327,188	13	9	
Working capital	23,811	6	3	
	£351,000	0	0	
From that period until 1846 no further call was made.				
At the close of 1845, the paid-up capital was as before				£351,000 0 0
Added thereto from profits				62,393 13 10
				£413,393 13 10
Expended on plant	£405,408	7	6	
Working capital	7,985	6	4	
	£413,393	13	10	
The working capital being again too small, another call was made, increasing the paid-up capital to				£369,000 0 0
Added from profits				62,393 13 10
				£431,393 13 10
Amount expended on plant, as before	£405,408	7	6	
Working capital	25,985	6	4	
	£431,393	13	10	
At the close of 1863, the paid-up capital was				£540,000 0 0
Added from profits				144,119 15 3
				£684,119 15 3
Amount expended on plant	£652,665	0	3	
Working capital	31,454	15	0	
	£684,119	15	3	

The company satisfied Parliament in 1864, when they obtained their new Act, that more than £144,000 had been taken from profits and expended in the extension of works; and they were then and are still prepared to show in detail the several amounts of profits as they were from time to time appropriated to capital, and the manner in which they were expended.

It must not, however, be inferred that the various sums above represented as working capital were sufficient for the purposes of the company. Such was by no means the case; but the directors, unwilling to make calls until the latest moment, have provided the requisite increase by obtaining advances, sometimes of large amount, from their bankers.

Your readers might also erroneously conclude that, when Parliament allowed this £144,000 to be capitalized, the dividends of the company did not exceed 5 per cent. per annum, whereas, in fact, the dividends had for several previous years considerably exceeded that amount.

Nor is the circumstance of the company's capital being so high as £8 10s. per ton of coals carbonized, fully or even sufficiently explained; but on this subject I will not now proceed further, as my object in addressing you is to convince your readers that the whole of the £144,000, permitted by Parliament in 1864 to be capitalized, had been expended out of profits in extensions of the company's works, and I trust that I have satisfactorily done this.

JOHN EDWARD JOHNSON,
Chairman of the Directors of the Phœnix Gaslight and Coke Company.

March 25, 1868.

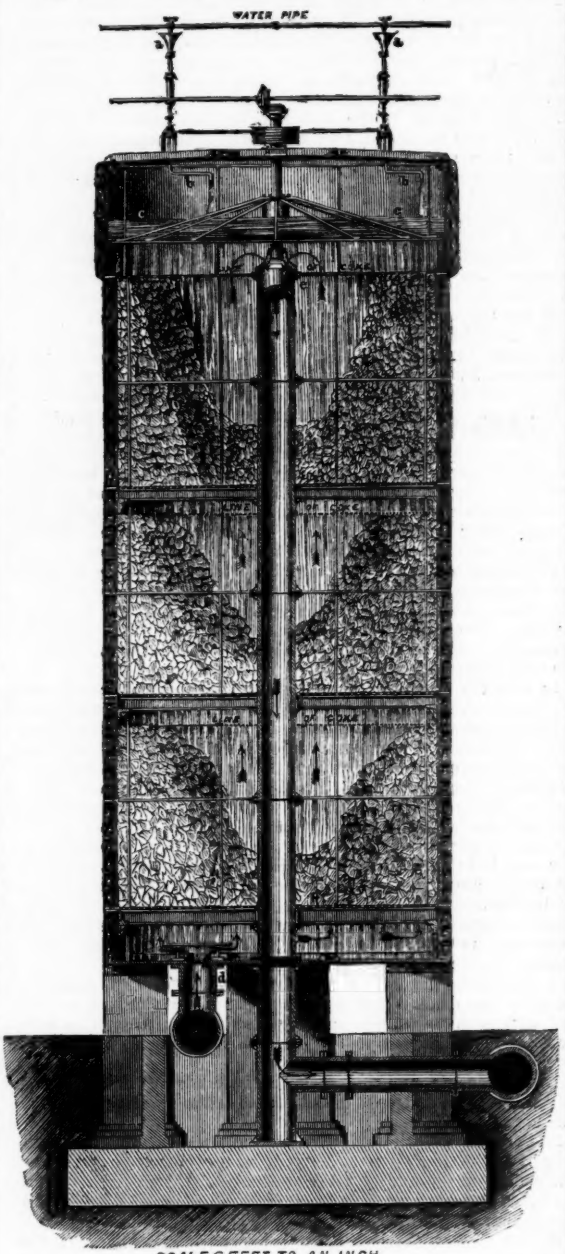
MANN'S IMPROVED SCRUBBER.

SIR,—The accompanying sketch shows the method of constructing scrubbers which I have adopted at these works, and as they have been in operation now more than eight years, and will, I believe, compare favourably with any other arrangement with which I am acquainted, especially those of the small-hole distributing class, I shall be obliged if you will allow me to mention a few particulars respecting them.

We have five scrubbers in action during the winter months, and they will remove all the ammonia from the gas, when the make is over 130,000 cubic feet per hour, and the water, by passing only once through, comes out 14 oz. strength.

Before this plan of scrubber was used the average quantity of gas liquor produced here was less than 9 gallons per ton of coals, but now, by allowing the strong liquor from the scrubbers to mix with the weak liquor from the mains and condensers, the quantity for sale is 22 gallons per ton of 10 oz. strength. A large portion of sulphuretted hydrogen is also removed, thereby reducing the cost of purifying, and at the same time improving the sanitary condition of the works.

The quantity of water required is supplied to the revolving feeds, *a a*, and by the rotation of the arms, *b b*, is spread over the brushwood, *c c*, which revolves at a rate of about 2½ times per minute, thereby dividing and dropping the water on the coke or other material used for filling the vessel. Each chamber or section is charged to the height marked "Line of coke," a portion of which is left out in the drawing, to show the construction of the apparatus. The gas enters at *d*, and, taking the course



shown by the arrows, descends the pipe *e*, which also serves as a column to support the girders and gratings on which the coke is placed. The centre shaft is hollow; it revolves in a step fixed to the centre column. This step is so made as to contain about a pint of oil; a small quantity being poured down the shaft once a week displaces a similar quantity of dirty oil, and keeps the only part which has any weight to carry well lubricated. A half-horse engine drives all that belongs to the five scrubbers, and the whole goes on from year to year without any other attention than oiling the gear and testing the strength of the liquor.

W. MANN, Engineer.

City of London Gas-Works, March, 1868.

CITY OF MOSCOW GAS COMPANY.

SIR,—At the extraordinary general meeting of shareholders held on the 21st of February last, when I moved for a committee of investigation, almost every speaker dangled before the mental

eyes of the proprietors the prospect of immediate bankruptcy if the £310,000 proposed to be raised were not at once forthcoming. One speaker went so far as to say it should be found before we left the room; and another, I believe the auditor of a company of which Mr. Blake is a director, graphically described one set of persons as getting one shell, another set the other, and a third the oyster, if we did not put our hands in our pockets first and inquire afterwards. In other words, that there should be a blind following of blind leaders. The committee of consultation, however, think otherwise; and, by a circular letter issued to-day, recommend that an experienced gas engineer be sent out to Moscow in order that they may possess the necessary materials upon which to issue a trustworthy report to their co-partners. I expressed at the meeting my confidence in the committee of consultation, and I am happy to find they are furnishing evidence that that confidence is not misplaced. It is, indeed, matter of marvel to me that such men as Messrs. Drake and Gibbs could have entertained the belief that, upon the naked statements contained in the report of the directors, any capitalists, shareholders or otherwise, would embark their money, especially in the face of the many statements which have proved themselves devoid of solid foundation, and the many hopes which have failed to be realized. If our works be worth anything like what they have cost us, there are plenty of moneyed men who, upon proof of this fact, will be quite ready to lend us the sum we require at the very respectable interest of 8 per cent. per annum.

The committee of consultation hope to be able to issue their report early in May; and until then we must "rest," though we cannot be "thankful."

WILMOT KNIGHT.

London, March 26.

EFFECT OF VARIATIONS IN LEVEL UPON THE PRESSURE OF GAS IN MAINS.

SIR,—In mentioning "accidental openings in the main," I certainly did not refer to osmose. One can imagine sufficient means of communication between the interior of mains and the atmosphere without seeking so far. Take the sources of leakage for example.

This point is, however, not material to the question in hand, which is repeated by "Ignoramus" now in somewhat different form.

I will presume the vertical, hermetically sealed tube to be filled with gas of a density corresponding nearly to the atmospheric pressure at the surface of the earth, and in the following observations, for sake of simplicity, neglect the difference of specific gravity in both air and gas, consequent to the difference in elevation within the 100 feet, and assume the pressure due to a difference in elevation of 10 feet to be—for air 0·15, and for gas 0·05 inch water column, the specific gravity of gas being taken at one-third that of air.

The tube being hermetically sealed, the only pressure acting on the inside surface is that of the gas contained therein. The outside surface is acted upon by the pressure of the atmosphere.

I will suppose the pressure of the gas at the top of the tube to be 2 inches water column in excess of that of the atmosphere at the same level.

At a point 10 feet lower down the tube, the pressure inside the tube will be increased by the weight of a 10-feet column of gas = 0·05 inch water column, while at the same level outside the tube the pressure will be increased by a 10-feet column of air = 0·15 inch water column.

At the bottom of the tube, 100 feet below the top, the pressure will be increased.

On the inside surface, by $10 \times 0{\cdot}05 = 0{\cdot}50$ inch water column.
On the outside surface, by $10 \times 0{\cdot}15 = 1{\cdot}50$ inch water column.
Difference in favour of outside . 1·0 inch water column.

So that the excess of pressure inside as compared to outside the tube will, at the lowest extremity, be reduced to $2 - 1 = 1$ inch.

The pressure on the inside surface of the tube *increases* from top to bottom, in consequence of the weight of the gas; but the pressure on the outside increases also, and in a greater ratio, in consequence of the greater weight of air as compared to gas.

It is not the actual pressure of gas that is greater at the top than at the bottom of the tube. It is the *excess* of pressure of the gas in the tube, as compared to that of the atmosphere at the same level, that is greater at the top than at the bottom.

I have endeavoured in the above to give a plain, practical answer to the query, giving a rough sketch of the principles involved, and taking round numbers for illustration, and trust that as such it will be acceptable.

J. B.

Clapham, March 19, 1868.

Register of New Patents.

1827.—STEPHEN HOLMAN, of 10, Laurence Pountney Lane, London, in the co. of Middlesex, engineer, for "*Improvements in double-action pumps and in the methods of operating pumps, part of which improvements are applicable to other reciprocating machines.*" Patent dated June 22, 1867.

This invention consists, first, in making valve passages in the pump covers or ends of double-action pumps in close proximity to the reciprocating piston or pistons, which pistons are solid pistons without valves. Second, in an extension of the foregoing arrangement whereby pumps of greater working capacity are obtained. Third, in an arrangement of pump whereby two pistons are attached to one rod, each piston having a valve which reciprocates in the cylinder with it; one valve is also fitted to each cover; as the pistons are reciprocated in the cylinder, the single valves in each cover, whether a suction valve or a delivery valve, will open alternately, and the valves in the pistons will open and shut corresponding to the opening and closing of the valves in the covers; one water passage only is cast on the barrel, and the water or other fluid is drawn into the pump, through an induction-pipe between the pistons, and forced out through the pistons and through the valves in the covers. Fourth, in a simple method of operating the pump referred to in the third part of this invention. Fifth, in an arrangement of compound pump-valves, the object being to permit these and other pumps to be worked at quick speeds with a minimum of concussion at the time of the opening and closing of the valves at every reverse of the stroke.

1828.—THOMAS WILSON and WILLIAM HALL, both of the town and co. of the town of Newcastle-upon-Tyne, engineers, for "*Improvements in machinery or apparatus for raising and forcing water and other fluids.*" Patent dated June 22, 1867.

This invention relates to an eccentric rotary pump applicable to the purposes to which ordinary centrifugal or steam pumps may be applied, and serviceable also as a fire-engine. For this purpose a cylindrical case of metal is constructed, through the ends of which there is fitted eccentrically a revolving spindle working in shifting boxes. On this spindle, inside the case, is a cylindrical disc of metal having grooves radiating from the centre. Within these grooves are fitted diaphragms or pistons of metal, and on the ends thereof are projections or studs furnished with anti-friction rollers, or not, such projections engaging in an annular groove made concentrically in the inner face of each of the ends of the cylindrical case. The backs of the diaphragms are recessed so that they work through or across each other, each piston sliding partly into the opposite groove or slot, whereby they are firmly supported in the cylindrical disc at all points of their rotation. The inlet and outlet passages are placed on opposite sides of the cylindrical case. On imparting a rotary motion to the spindle, the several diaphragms will be caused to rotate in the cylindrical case, and will be simultaneously caused to slide to and fro along their guiding grooves by the cam action of the annular concentric groove in the ends of the cylindrical case on the projections on the ends of the diaphragms, thereby keeping the outer edges of the latter in contact with the inner circumference of the cylindrical case.

APPLICATIONS FOR LETTERS PATENT.

883.—THOMAS SPRING LAKE BEECH, of Charlton, in the co. of Kent, for "*Improvements in engines for obtaining rotary motion by means of steam, water, gas, or other fluids.*" March 16, 1868.

891.—WILLIAM EDWARD NEWTON, of 66, Chancery Lane, in the co. of Middlesex, civil engineer, for "*Improvements in the manufacture of illuminating gas in the distillation of hydrocarbons and the making of gaseous fuel for heating purposes.*" A communication. March 16, 1868.

898.—ROBERT SMITH, of Compton Road, Islington, in the co. of Middlesex, for "*Improvements in the means and apparatus for extracting foul air or gases from mines and otherwise.*" March 17, 1868.

915.—CLAUDE FRANÇOIS CONSTANT CRETIN-BORNE, of Glasgow, in the co. of Lanark, for "*Improved means or apparatus for ventilating or supplying air to mines and other places.*" March 18, 1868.

923.—BENJAMIN EDWARD REINA NEWLANDS, F.C.S., of 4, Malvern Terrace, Charlton, in the co. of Kent, for "*Improvements in treating and obtaining products from spent oxide of iron which has been used in gas-works or otherwise, to separate sulphur from sulphuretted hydrogen, and in the purification of sulphur obtained from such oxide of iron.*" March 18, 1868.

966.—JOSIAH GEORGE JENNINGS, of Palace Wharf, Lambeth, in the co. of Surrey, sanitary engineer, for "*Improvements in water-closets, and in apparatus for supplying water, and in sewers or drains for receiving the same.*" March 21, 1868.

969.—EDWARD KENWORTHY DUTTON, of 3, Smithy Door, Manchester, in the co. of Lancaster, consulting engineer, for "*Improvements in valves employed to regulate the flow of water.*" March 23, 1868.

976.—JULIUS BRÖNNER, of Frankfort-on-the-Maine, in the kingdom of Prussia, manufacturer, for "*Improvements in the construction of gas-burners.*" March 23, 1868.

988.—GEORGE BERTIE PATERSON, of 15, Arnold's Place, Francis Street, Walworth, in the co. of Surrey, machinist, for "*Improvements in gas-meter indexes.*" March 24, 1868.

998.—FREDERICK WILLIAM CROHN, of 4, Cullum Street, Fenchurch Street, in the City of London, consulting engineer, for "*Improvements in apparatus for obtaining power from a fall of water.*" March 24, 1868.

1002.—JOSHUA ANTILL, of Wandsworth, in the co. of Surrey, plasterer, for "*Improvements in stench-traps.*" March 24, 1868.

1031.—WILLIAM HENRY SAINT AUBIN, of Wolverhampton, in the co. of Stafford, machinist, for "*Improvements in and additions to cocks and taps for drawing off liquids and gases from pipes, casks, or other vessels, which improvements and additions may also be applied to cocks and taps for filling vessels.*" March 26, 1868.

1033.—HENRY DAVEY, of 9, Victoria Chambers, in the city of Westminster, engineer, for "*Improvements in steam-engines, part of which is applicable to steam-pumps.*" March 26, 1868.

GRANTS OF PROVISIONAL PROTECTION.

482.—JOHN TOWLE, of Cold Harbour, near Oxford, in the co. of Berks, justice of the peace, for "*Improvements in the arrangement of sewers and drains for the collection and distribution of sewage matters.*" Feb. 12, 1868.

706.—WILLIAM ROLLO, of Dundee, in the co. of Forfar, N.B., for "*Improvements in the arrangement and construction of water-closets.*" March 2, 1868.

727.—GEORGE ANDERSON, of Northumberland Street, Strand, in the co. of Middlesex, gas engineer, for "*Improvements in apparatus for moulding and compressing substances for artificial fuel.*" March 3, 1868.

747.—GEORGE DAVIES, of 1, Serle Street, Lincoln's Inn, in the co. of Middlesex, and 87, St. Vincent Street, in the city of Glasgow, civil engineer and patent agent, for "*Improvements in the manufacture of gas for lighting and heating.*" A communication. March 4, 1868.

770.—ALEXANDER MELVILLE CLARK, of 53, Chancery Lane, in the co. of Middlesex, mechanical draughtsman, for "*Improvements in steam-pumps.*" A communication. March 5, 1868.

802.—EDWARD CASPER, of 101, Cannon Street, in the City of London, merchant, for "*An improved apparatus for raising and forcing liquids, more especially designed for supplying water to steam-boilers.*" A communication. March 7, 1868.

810.—AUGUSTUS FRASER BAIRD, of Pimlico, in the co. of Middlesex, lieutenant-colonel in the Bengal Staff Corps, for "*Improvements in earth-closets, applicable also to urinals.*" March 9, 1868.

817.—PHILIP FANCKES HALBARD, of Burton-on-Trent, in the co. of Stafford, for "*Improvements in stench-traps.*" March 9, 1868.

820.—WILLIAM BARNS KINSEY, of 92, Cannon Street, in the City of London, engineer, for "*Improvements in apparatus for carburetting or increasing the illuminating properties of coal gas.*" March 10, 1868.

824.—ROBERT MELDRUM, of Pittormie, Cupar, in the co. of Fife, N.B., for "*Improvements in apparatus for raising water.*" March 10, 1868.

839.—SAMUEL NAYLOR, of Ravensfleet, in the parish of East Stockwith, in the co. of Lincoln, engineer to the Morton Carr Drainage Proprietors, for "*Improvements in apparatus for raising water.*" March 11, 1868.

883.—THOMAS SPRING LAKE BEECH, of Charlton, in the co. of Kent, for "*Improvements in engines for obtaining rotary motion by means of steam, water, gas, or other fluids.*" March 16, 1868.

891.—WILLIAM EDWARD NEWTON, of 66, Chancery Lane, in the co. of Middlesex, civil engineer, for "*Improvements in the manufacture of illuminating gas in the distillation of hydrocarbons and the making of gaseous fuel for heating purposes.*" A communication. March 16, 1868.

NOTICES TO PROCEED.

3225.—RICHARD HARRISON, of 7, Sackville Place, in the city of Dublin, brassfounder, for "*Improvements in cocks or taps.*" Nov. 14, 1867.

3228.—LEVI ALFRED WAINMAN, of Leeds, in the co. of York, engineer, for "*Improved apparatus for raising water.*" Nov. 14, 1867.

3245.—RICHARD HOWSON, of Middlesborough-on-Tees, in the co. of York, engineer, for "*An improved gas-furnace.*" Nov. 15, 1867.

3563.—EDWARD HAMMOND BENTALL, of Heybridge, near Maldon, in the co. of Essex, agricultural implement manufacturer, for "*Improved apparatus for controlling the draught of water from constant-supply pipes.*" Dec. 14, 1867.

138.—JOSHUA KIDD, of St. Paul's Wharf, in the City of London, engineer, for "*Improvements in obtaining artificial light, and in apparatus employed therein.*" Jan. 15, 1868.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

684.—CHARLES JOHNSON, "*An improved combined tee-piece and valve.*" March 11, 1865.

717.—GEORGE TOMLINSON BOUSFIELD, "*Improvements in apparatus for vaporizing hydrocarbon liquids for illuminating and heating.*" March 14, 1865.

761.—JOSEPH WALLS, "*Improved arrangements and apparatus for drawing off liquors or liquids from casks and other vessels without the aid of pumps.*" March 18, 1865.

791.—JAMES SMITH and SYDNEY ARTHUR CHEASE, "*An improved arrangement of valves and other appliances for a new description of hydraulic engine for raising water and other fluids above their common level, the fluids so raised to be used as a motive power.*" March 21, 1865.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £100 BEFORE THE EXPIRATION OF THE SEVENTH YEAR.

212.—JOHN HENRY JOHNSON, "*Improvements in obtaining motive power from the expansion and compression of air, gas, or vapour, and in the machinery or apparatus employed therein.*" Jan. 26, 1861.

572.—GEORGE ESKHOLME, "*Improvements in apparatus for regulating the supply of water to water-closets, and for other purposes where an occasional or intermittent supply is required.*" March 6, 1861.

593.—JOSEPH JACOB, "*Improvements in the mode of and apparatus for obtaining gas, and the application thereof for domestic, manufacturing, and other purposes.*" March 9, 1861.

652.—FREDERICK TRACHSEL and THOMAS CLAYTON, "*Improvements in the manufacture of gas, and in the apparatus employed therein.*" March 15, 1861.

Parliamentary Intelligence.

HOUSE OF LORDS.

TUESDAY, MARCH 24.

The LEWES WATER Bill was reported, with amendment.

FRIDAY, MARCH 27.

The LEWES WATER Bill was read a third time, and passed, and sent to the Commons.

HOUSE OF COMMONS.

MONDAY, MARCH 16.

The WELLINGBOROUGH WATER Bill was read a second time, and committed.

A petition was deposited against the SLIGO BOROUGH IMPROVEMENT Bill, from the Grand Jury of the county of SLIGO.

TUESDAY, MARCH 17.

The METROPOLIS GAS Bill.—The report that the Standing Orders have been complied with laid upon the table.

WEDNESDAY, MARCH 18.

A petition was deposited against the WELLINGBOROUGH WATER Bill, from the Wellingborough Local Board of Health.

THURSDAY, MARCH 19.

The TOPSHAM, WOODBURY, AND LYMPSTONE WATER Bill was reported.

FRIDAY, MARCH 20.

A petition was deposited against the WELLINGBOROUGH WATER Bill, from the London and North-Western Railway Company.

TUESDAY, MARCH 24.

The LOUGHBOROUGH GAS Bill was reported.

A petition was deposited against the BRADFORD WATER-WORKS AND IMPROVEMENT Bill, from the Idle Local Board of Health.

FRIDAY, MARCH 27.

The METROPOLIS GAS Bill.—Petition of Rugeley Gas Company against the Bill to lie upon the table.

The METROPOLIS GAS Bill.—Second reading deferred till Tuesday next, March 31.

COURT OF REFEREES.

MONDAY, MARCH 22.

FARNWORTH AND KEARSLEY GAS BILL.

(*Before Mr.* DODSON, *Chairman; Mr.* RICKARDS, *and Colonel* STEWART.)

The *locus standi* of the petitioners against this bill—the Radcliffe and Pilkington Gas Company—was considered this day. The Farnworth and Kearsley Gas Company have brought in a bill for the present session to enable them to raise additional capital, and for other purposes. The company were incorporated by Act of Parliament in 1854, for supplying gas within the several townships of Farnworth and Kearsley, in the county of Lancaster. By the Act they were authorized to raise £24,000, which sum they raised by shares; but as, in the natural order of things, the population and number of houses within those two townships have of late years considerably increased, the company require further powers and capital to enable them effectually to carry on their undertaking, and they deem it expedient that they should be enpowered to light not only Farnworth and Kearsley, but also part of the adjacent townships or hamlets of Little Hulton, Little Lever, Pilkington, Outwood, and Clifton, in the same county, though they do not propose to erect works at any of those places. They seek for power to raise, in addition to the capital which they were authorized to raise by their previous Act, any further sums not exceeding in the whole £30,000, by the creation of new ordinary or new preference shares, or partly by new ordinary and partly by new preference shares; but these shares are not to be issued until one-fifth part thereof shall have been paid up. The company are not in any year to make out of their profits any larger dividend on the additional share capital of £30,000 than £7 10s. per cent. actually paid of such capital on ordinary shares, or £6 per cent. actually paid of such capital on preference shares. Power is also asked for to borrow on mortgage and to create and issue debenture stock. Clause 15 imposes obligations as to supply; clause 16 gives power to place lights against buildings; and clause 17 refers to the illuminating quality of the gas, which shall produce from an Argand burner, having 15 holes and a 7-inch chimney, and consuming 5 cubic feet of gas an hour, a light equal in intensity to 14 sperm candles of six to the pound, burning 120 grains an hour. An experimental meter is to be erected, so that consumers may test the illuminating power of the gas. The other clauses are of the ordinary character.

Against the bill a petition has been lodged by the Radcliffe and Pilkington Gas Company, who allege that they are injuriously affected by it, so far as the proposed extension of limits involves an invasion of their district. They were originally incorporated by an Act passed in the ninth year of the reign of her present Majesty, which was repealed. They were, however, re-incorporated in 1854, when powers were conferred upon them for lighting the town and parish of Radcliffe and the township of Pilkington, and also a distance of three miles from the centre of Radcliffe Bridge; and they allege that such radius includes, amongst other places, the township of Little Lever, the hamlet of Outwood, and part of the township of Clifton, the whole or part of which the Farnworth and Kearsley Gas Company, by their bill, propose to light, thus invading their district and entering into competition with them. They submit that such competition in uncalled for, and that it ought not to be permitted, and that if authorized the Farnworth Company would have power to break up streets and lay down thereunder mains and pipes, and so would interfere with the works of the petitioners, and injuriously affect their present rights and property; so much, therefore, of the preamble of the bill as affirmed the expediency of the Farnworth Company being empowered to light the before-mentioned places they said was unfounded and incorrect, and could not be substantiated by evidence; and that there were several clauses and provisions in the bill prejudicially affecting their interests, while it contained nothing for their protection. They therefore prayed that the bill might not pass into law.

Mr. VERNON HARCOURT, Q.C., supported the petition, which was opposed by the Hon. G. SOMERSET, the objections to the *locus standi* of the Radcliffe and Pilkington Gas Company being (1) that the petitioners had no exclu-

sive powers of lighting with gas any lands or buildings to which the limits of the promoters were proposed to be extended by the bill, but only the ordinary powers to supply gas within the limits referred to in the petition; (2) the petitioners had no such exclusive powers as aforesaid, and they did not, in fact, and never did, light any part of the district included within the promoters limits, as proposed to be extended by the bill; (3) the competition referred to in the petition was not of a description to entitle the petitioners to be heard upon the ground of competition according to the ordinary rules of parliamentary practice; and (4) the petitioners had no such interest in the subject-matter of the bill as would entitle them to be heard upon the petition against it according to the practice of Parliament. The learned gentleman contended that there was virtually only one company, and that the petitioners had not the exclusive possession of the district which was proposed to be lighted.

Mr. RICKARDS said that it could not be contended that Parliament, when it gave powers to a company, intended to confer upon it an eternal monopoly in the district in which their works were located.

The Hon. G. SOMERSET said that his point was, that the petitioners were simply incorporated with power to break up the streets and so forth, and not to have exclusive possession of the district. If anybody were to be heard it ought to be the Local Board of Health, and not such a company as the petitioners were. He did not know whether it was material or not, but it was a matter of fact, that the petitioners had not supplied the district, and that the corporation of Salford had got some portion of their radius. They were reincorporated in 1854, and powers were then conferred upon them for lighting the town and parish of Radcliffe and the township of Pilkington, but those powers had not been exercised; and he thought the court would agree with him that, after having had 14 years possession of a district without lighting it, they ought not to come forward now and petition against a company which really meant to benefit it.

The CHAIRMAN said that the court were decided to allow the *locus standi* of the petitioners.

COMMITTEE ON UNOPPOSED BILLS.

TUESDAY, MARCH 24.

(*Before Mr.* DODSON, *Chairman; Hon.* A. KINNAIRD, *and Mr.* HARTOPP.)

LOUGHBOROUGH GAS BILL.

In the year 1836 a joint-stock company was formed in the town of Loughborough, Leicestershire, for the purpose of manufacturing gas for supplying the inhabitants, and in 1846 a Deed of Settlement was executed by the shareholders, provision being made for the continuation of the company and the management of its affairs. The capital was £9996, divided into 1666 shares of £6 each, the whole of which was paid up and expended for the purposes of the company, and they have borrowed and owe on mortgage £400 or thereabouts, and they have floating debts to the amount of about £1000: 244 shares were issued at a premium of £3 per share, and the money (£732) received in respect of such premium has been expended on capital account. From time to time the company has laid out upon the extension of their works various sums of money applicable to the payment of dividends to the shareholders, to an amount exceeding £3500. They are desirous of capitalizing such sums, and as the demand for gas has increased, they require further capital and powers to enable them effectually to carry out their undertaking. It is proposed that, after the passing of the Act, the company constituted under the Deed of Settlement shall cease to exist, and a new company be formed for the purpose of supplying gas within the limits stipulated, and to be called the "Loughborough Gas Company." Their powers are to manufacture gas, to sell residual products, to use any new invention in relation to the manufacture or distribution of gas, to manufacture and sell gas-fittings, pipes, &c., to the consumers of gas, but nothing is to except them from being indicted for a nuisance. The property vested in the company is to be incorporated by the Act, and the Deed of Settlement is to be void without prejudice to remedies for antecedent breaches thereof. All contracts prior to the passing of the Act are to be binding, actions are not to abate, and judgments in respect of existing liabilities may be enforced against individual shareholders. By the Act, the capital of the company is to be £25,000, whereof £13,330 is called the original, and £11,670 the additional capital. Clause 24 is considerably amended. The original capital of the company is to be a consolidated stock and subject to the provisions of the Act, such stock being appropriated to the several persons and corporations who, before the passing of the Act, were holders of shares in the capital of the dissolved company. Every holder of an existing share of £6 is to be entitled in substitution to £8 of such consolidated stock without any further payment for the same. The company may call in and cancel existing share certificates, and issue new certificates in lieu thereof; power is also given to raise additional capital from time to time, not exceeding £11,670. The prescribed rate of dividend on the original capital is to be £8 per cent. per annum; and on the additional capital raised by the Act the company is not in any year to make out of their profits any larger dividend than £7 of such capital on ordinary and £6 on preference shares. Clause 31 gives power to borrow on mortgage. Debenture stock may be issued at £5 per cent. The number of directors is to be twelve, six to form a quorum. Dividends may be declared half yearly. Clauses 49 and 50 give powers as to the construction of works, and to lay pipes against buildings. The price to be charged for the gas supplied by meter is not to exceed 4s. 3d. per 1000 feet, and consumers may be required to burn by meter. The price for the public lamps to be paid by the local board is to be fixed at a price not exceeding the lowest price for the time being charged to any private consumer. The illuminating power of the gas is to be equal to 14 sperm candles, and it is to be so far free from sulphuretted hydrogen as not to discolour moistened test-paper imbued with acetate or carbonate of lead when exposed for a minute to a current of gas issuing under a pressure of 5/10ths of an inch of water, and not to contain more than 20 grains of sulphur nor more than 5 grains of ammonia in 100 feet of gas when tested by Dr. Letheby's apparatus. The company are to erect and maintain a meter to test the illuminating power, furnished with an Argand 15-hole burner and a 7-inch chimney, and there is a rider to the following effect: that it is to be lawful for the local board to erect and maintain, at the cost of the board, such meter and apparatus at any place within 500 yards of the company's works in lieu of the meter to be provided by the company, but the gas is always to be supplied thereto from the nearest main by an independent service-pipe, and such meter and apparatus is to be erected and maintained under the superintendence and to the reasonable satisfaction of the manager of the company. The local board may appoint, by an order in writing, some competent person to test the gas, upon giving two hours notice to the manager or other authorized officer of the company, and if it is proved to the satisfaction of two justices that it is not equal to the illuminating power prescribed by the Act, the company is to forfeit a sum not exceeding £20. The costs of the experiment are to be paid according to the event.

Mr. KINNAIRD asked why the company wished to come to Parliament, as by so doing they would subject themselves to restrictions under which they did not labour before.

Mr. PARKES (from Messrs. Dyson and Co., the parliamentary agents) said that the company did not wish to get into opposition with other parties, especially the local board, and moreover they considered that a parliamentary *status* was desirable.

Mr. WOOLLEY, the local solicitor to the bill, added that the company had also got to the extreme limit of their capital and borrowing powers under the Deed of Settlement.

Mr. KINNAIRD said there were many disadvantages under incorporation, such as restrictions on dividends, and so forth. Was Loughborough an increasing place?

Mr. WOOLLEY said that it was tolerably stationary as regarded population, which was now about 12,000 in round numbers.

The CHAIRMAN observed that the company had applied £3500 out of revenue to extensions.

In reply to Mr. RICKARDS (Speaker's counsel), the SOLICITOR said that the dividends for the last four or five years had been about 7½ per cent., and that they now proposed to pay 8 per cent.

The CHAIRMAN: Are the directors paid?

Mr. WOOLLEY replied in the negative.

Mr. KINNAIRD: Not the chairman?

Mr. WOOLLEY: None of them.

Mr. KINNAIRD: Noble patriots!

The CHAIRMAN: The Local Board of Health, I see, are to have power to test the quality of the gas.

Mr. WOOLLEY: They are anxious to have a meter on their own premises.

Mr. KINNAIRD: Is that because they suspect the company?

Mr. WOOLLEY: No, but to make it doubly sure.

There was no opposition, and the bill, as amended, was then allowed.

Legal Intelligence.

BUCKS LENT ASSIZES.

AYLESBURY, TUESDAY, MARCH 10.

(*Before Baron* BRAMWELL *and a Special Jury.*)

TILLY *v.* SLOUGH GAS AND COKE COMPANY.

This was an action brought by Mr. Tilly, corn chandler, and the owner of house property in the town of Slough, against the Slough Gas and Coke Company, for damages arising from nuisances occasioned by the defendants in carrying on their operations. Mr. O'MALLEY, Q.C., and Mr. DOUGLAS BROWN appeared for the plaintiff; and Mr. KEANE, Q.C., and Mr. METCALFE for the defendants.

Mr. DOUGLAS BROWN opened the pleadings. The declaration in the first count stated that the plaintiff demised by deed certain lands to the defendants, for the erection of their works, and that the defendants in that deed covenanted with the plaintiff that they would, to the utmost of their power, from time to time, as occasion might require, prevent all noisome effluvia from matters to be made or used in the manufacture of gas upon the said land from escaping and becoming offensive to the occupiers for the time being of the premises belonging to the plaintiff; and also that the plaintiff, his agents, surveyors, or workmen, might at all reasonable times enter upon the said premises to inspect the same. The declaration alleged a breach of both these covenants. The second count alleged that the plaintiff was possessed of certain lands and premises, let to divers tenants, and that the defendants had wrongfully caused or permitted to issue and proceed from their works offensive liquid and other matters, by which the water and streams in the plaintiff's land had been polluted. The defendants set up a variety of pleas.

Mr. O'MALLEY said the plaintiff was the owner of a considerable portion of land in the town of Slough, and he complained of the Slough Gas and Coke Company on certain grounds, which would be brought before the court as briefly as possible. The town of Slough had, during the last few years, increased very considerably in size and in population. In 1849, when the gas-works were first established, one gasholder and tank and six retorts more than sufficed to meet the wants of the inhabitants; but the works now consisted of three gasholders and tanks and 20 retorts. The plaintiff in 1849 let to the defendants, on a lease for 99 years, a small portion of land on which to erect their works. He endeavoured by a covenant in the lease to protect himself and his tenants in the neighbourhood from any nuisance arising from the manufacture of gas, and the company undertook to use all the means in their power to prevent anything of the kind; but so far from fulfilling that covenant, they had, from the period of their first formation down to February last, when they were obliged to prepare for an inspection under a judge's order, done everything to aggravate the nuisances arising from the manufacture of gas. It was well known that there were several stages in which considerable nuisance was occasioned. The first was by the escape of the gas itself from the retort-house. In all well-constructed works that was prevented by a ventilating funnel along the ridge of the roof of the retort-house. Then there was the process by which the gas was freed from its impurities. For this purpose it was passed several times through lime or oxide of iron, with which the impurities had more affinity than they had with the gas itself. Where the purifiers were large in proportion to the amount of gas made, it was not necessary very frequently to change the lime; but where they were small in proportion to the amount made, the lime required to be frequently changed, and every time the change was made a terrible stench was created within the works. There was nothing known more offensive or injurious than the lime which had been employed for the purpose of purifying gas, and where parties were bound to use the best means of preventing injury and annoyance to the neighbourhood, the oxide of iron was always substituted for the lime. In every populous place the oxide of iron was used for that purpose; in the City of London nothing else was employed, and the result was that in the neighbourhood of the Temple, where some of the largest gas-works were erected, and where a large number of gentlemen had their chambers, it was proved a short time ago, in an inquiry before the House of Commons, that no nuisance was occasioned by the works. It would be shown that the defendants had to remove their lime very frequently, and that they piled it up in an open yard (where it exhaled effluvia of the most terrible character), until they could find a farmer to purchase it and carry it away. It was removed in the day time, and when stirred up the smell was most offensive. In the process of making and purifying gas two substances were separated—the tar, which ought to be collected in a perfectly water-tight well; and the ammoniacal liquor, which emitted a most terrible stench. In every well-regulated company these things were immediately placed in reservoirs of some kind, and carried away in such a manner as to emit no

unpleasant odour; but in the case of the defendants, not only was all provision for rendering the tar and ammonical liquor innocuous entirely neglected, but by a monstrous course of proceeding the nuisance was considerably aggravated. In 1849, when these works were constructed, there was, as he had already stated, only one gasholder. Probably the jury were aware that a gasholder was a hollow metal vessel floating with its mouth downward in a tank of water. When it contained no gas it sank down until the top of the vessel almost touched the water, and as it was filled with gas it rose, being guided by chains and pulleys fixed overhead to a framework. As the gas filled the holder, the water in the tank was pressed with considerable force against the bottom of the same, and, of course, in process of time would be found to be strongly impregnated with gas. It was therefore of the utmost importance that the tank should be perfectly water-tight, otherwise the water would ooze through the soil, and percolate to a considerable distance and with more or less speed, according to the nature of the soil. The defendants works being built on a loose gravelly, sandy soil, it travelled with considerable rapidity. In a stiff clayey soil it might not travel at all, the clay forming a perfect barrier to its course. The proprietors of the Slough Gas-Works, when they commenced their operations in 1849, had no regular engineer to superintend the erection. The tanks, instead of being made of cast metal, well bolted, so as to prevent any escape, were constructed of masonry, with clay puddle within. No doubt a perfect clay puddle, well applied and kept in a good state, might be an effective obstacle to the escape of any liquid from the tank; but it was subject to derangement, and was often very imperfectly made. The result was that almost from the moment when the first tank was used there was considerable leakage from it, and the defendants had been obliged to do what was very unusual in works of this description, and ought never to be required—to pump in water continually for the purpose of replenishing the waste by the leakage. If a tank was water-tight there was no waste except frome vaporation, and the amount that escaped by that means was well known. There was nothing in the process of gas-storing which caused a consumption of the water in any way, and evidence would be called to prove what was the waste from evaporation, and that the quantity pumped in was out of all proportion to the quantity which could thus have been lost. So great, indeed, did the leakage at last become, that one of the persons who conducted the works for the company had actually to lay a pipe from the street into the tank, so as to replenish the water by a supply from a stream which ran along the road. In addition to this, it would be shown to the jury that for years, and until within two years of the present time, that tank was used in the most extraordinary way. In 1863, the company increased their works by adding a new gasholder and some more retorts. In 1865, they added another holder and more retorts, so that, as already stated, there were at the present time no less than 20 retorts on the works. But with all these additions the company seemed to have made no provision for other matters connected with the operations of gas-making, and their tar and ammoniacal liquor, instead of being run into a covered well, were actually conveyed into the tank of the first gasholder, which, being leaky, suffered these matters to escape and permeate the soil round about. The defendants were, on one occasion, detected cutting into one of the new sewers of the Board of Health, in order to carry off the enormous contents of that tank into the river Thames, for which they were convicted under the auspices of his very respected friend, Dr. Letheby, whom he saw present on this occasion to give evidence in their favour. No. 2 tank was constructed in the same way. The plans were drawn by a gentleman who was a tallow chandler, and not likely to possess much architectural or scientific knowledge. He, however, drew the plans, and the tank was constructed by an ordinary tradesman in the place. Certain it was that the tank was built in such a manner that leakage was continually occurring. No. 3 tank was next built, and with considerable ingenuity it was puddled, but the puddle was afterwards broken through. At the bottom of the tank stones were fixed for the gasholder to rest upon, but, by some mismanagement in the construction of the holder, the stones were broken, and they then actually cut through the puddle, and replaced the broken stones with common brickwork masonry. The puddle was also diminished in depth, and the men employed, not knowing what the puddle was for, drove their scaffold-poles into it in the execution of their work. The result was that from 1863 down to 1866 every annoyance and nuisance which had been felt before was greatly aggravated. The plaintiff complained, first of all, of the absence of any endeavour on the part of the company to prevent the escape of effluvia from their retort-house; and, secondly—and this was one of the strongest grounds of complaint—of the constant nuisance arising from the process of lime purification on their premises. But all these things failed in magnitude when compared with the injury to the water from the percolation of impurities through the soil. There were several wells upon the property of Mr. Tilly. It might be necessary to call before the jury some other persons who had suffered from the nuisance, but at present he would not say more than that the injury was not confined to Mr. Tilly's premises—it extended to the whole neighbourhood round. The plans produced would show the fall of the strata, and evidence would be produced to prove that the soil between the gas-works and far beyond the extremity of Mr. Tilly's land was completely saturated with tar and ammoniacal liquor, which could have escaped from no other place than these works. Whenever water was drawn from these wells, the smell was unendurable; and he need hardly say the taste was still worse. The result was that Mr. Tilly's tenants, some of them medical men, had left his houses; all his property was reduced considerably in value; he had been obliged, in some cases, to take less rent, and in others he could not get fresh tenants at all. Neither cattle nor human beings could drink the water on the property, and Mr. Tilly had been obliged to bring water from a considerable distance, beyond the range of the contamination of the defendants works. Near the defendants tanks, especially near No. 1, there was an examining-well dug down to a considerable distance, and, if the tanks were perfectly water-tight, this well would be constantly dry. But it had been found that water accumulated there, and rose to the level of the water in the tanks, thus showing the existence of the leakage. Various complaints had been made on the subject of the nuisance, and the result of those complaints, as usual in cases of this description, was that the company denied that they could be the cause of it. It was a principle of the British constitution that "the Queen can do no wrong." That principle, in the eyes of certain officials, had been extended to the operations of railway and gas companies, and, according to the secretaries of these companies, it was impossible they could do wrong.

Baron BRAMWELL: According to some people, Mr. O'Malley, gas companies can do no right. They get uncommonly ill-used, I must say.

Mr. O'MALLEY continued: The answer which the defendants made to these complaints was, that the parties must be mistaken. He did not know what Dr. Letheby was to be brought forward to prove; but he ventured to think Dr. Letheby would not offer an opinion that the water was drinkable, or that the effect of the percolation of these matters through the soil could possibly be beneficial to the neighbourhood. The company suggested that the nuisance arose from the cesspools, but that suggestion would be negatived by the evidence brought forward by the plaintiff; and the result of the experiments which would be detailed would leave no doubt on the minds of the jury that the nuisance was occasioned by the gas-works alone. This was the nature of the case to be submitted to the jury, and upon which their verdict would be asked for the plaintiff. His learned friend (Mr. Brown) reminded him that there was a count in the declaration for a breach of covenant, in refusing to allow the plaintiff with his servants to inspect the works. This would be proved beyond all question, and for that breach reasonable damages would be asked.

Mr. *James Tilly*, examined by Mr. BROWN.

I am the plaintiff in this action, and have resided at Slough for 45 years. I am the proprietor of the land marked on the plan produced, which is occupied by me and my tenants. In 1848 I granted a lease of part of my land to the defendants for 99 years, and another portion in 1849. The town of Slough was then about a fourth of its present size. One small gasholder was first erected, which sufficed for some years. The company subsequently erected a second. They did not ask my consent. I should have objected if they had. In 1865 a third gasholder was built. It was about 15 years ago when I first perceived the smell of the gas in the water. It gradually increased, and I repeatedly complained. I was once a director of the company; but finding that my complaints were not attended to I resigned. I have been trying for years to obtain a remedy. Dr. Buée was one of my tenants. He left me in 1858, not being able to drink the water. He paid £50 a year rent. The house was empty 3½ years. Dr. Baker was the next tenant. He paid £42. He remained about a twelvemonth, and then left. I then let it to Dr. Finch, who paid the same rent; then to Mr. Boulter, the present tenant, who pays £35. There is another house that was occupied by Dr. Buée, and afterwards by my daughter. It was empty six or twelve months. It was let to a gentleman for £35; Mr. Barrett now pays the same for it. I have built two additional rooms. Dr. Buée paid £40. The house, at the present value of property in Slough, ought now to fetch £50. The house occupied by Mrs. Williamson brings in £25 for rent; the former rent was 25 guineas. With regard to some of the houses, I have to fetch drinking water for the tenants, as they complain that their own is not fit for use. One house that I formerly let for £31 10s. I now let for £27, having spent £50 in building a large school-room in connexion with it.

WEDNESDAY, MARCH 11.

Mr. *Tilly* recalled, and examination continued.

I have lived in my house 24 years. I consider that it is depreciated in value £15 or £20 a year. I have a meadow which might be valuable for building, for which purpose I bought it.

Mr. BROWN: Do you know the value of building ground in the neighbourhood?

Mr. KEANE objected.

Mr. BROWN said his object was to show that the plaintiff's land was depreciated in value.

Baron BRAMWELL said the plaintiff had sustained no loss in respect of the building ground.

Mr. BROWN said the loss was no doubt prospective.

Baron BRAMWELL: He must bring a fresh action when it happens.

Examination continued: Mr. Morten is a tenant of mine. He holds under a lease. He lives at the corner of Chandos Street. Mr. Duffield is another tenant, also under a lease. I remember smells in the air from the gas-works for many years. It was about 20 years ago that I first perceived them. The works are situated north-east from me, and when the wind blows from that quarter they are always worse. About two months ago they were very bad and suffocating. Last November I sent a notice to the company of my desire to enter the premises. A few days afterwards I went there, accompanied by Mr. Fussell and Mr. Duffield. The manager told me I might come in, but no one else. We then left. My son is my agent for this property.

Cross-examined by Mr. KEANE: Mr. Fussell was formerly the occupier of the works for seven years. He may have been at loggerheads with the company. That is not the reason why I selected him. I wished him to go with me because he is acquainted with gas matters. His disputes with the company had nothing to do with me.

Mr. KEANE: Were you not told that anybody might come but Mr. Fussell?

Witness: No. I was denied admission with Mr. Fussell, and we retired.

Baron BRAMWELL: Is not this a trumpery matter? I doubt whether Mr. Fussell came within the covenant of the lease which gives permission to the plaintiff, his agents, surveyors, and workmen to enter and inspect the premises. Is it worth while, when we have got more serious matter to inquire into, to be entangling ourselves with this?

Witness: I appointed him my agent.

By Mr. KEANE: There are two great gates on the land held under the lease of 1848.

Mr. KEANE: And those are the gates to which you should have gone under your lease of that date.

Baron BRAMWELL: Which gate did he go to?

Mr. KEANE: He went to the gate on the land held under the lease of 1849.

Baron BRAMWELL: In which there is no covenant to enter?

Witness: I cannot say.

Mr. KEANE: Do you know Mr. Brummell Smith?

Witness: Yes.

Mr. KEANE: If your son had not gone there at an improper hour, and been turned out, you would not have brought these proceedings, would you?

Witness: Yes, I should; I have suffered long enough.

Mr. KEANE: In November last, there were some proceedings before the magistrates in an assault case?

Witness: Yes.

Mr. KEANE: Before the hearing came on, did you say, "They have been knocking Henry about; I have looked into my lease, and I find I can get rid of them; I shall give them notice at once"?

Witness: I might have said so.

Cross-examination continued: I have no recollection of saying to Mr. Morten, when he was taking his lease, that gas-works were wholesome, and that there would be no fever illness in the neighbourhood. It is very improbable. I do not know what the rates are at Slough. One of my houses was empty for three years continuously. It was formerly let for £50, and now it is reduced to £35. It had a stable when it was let for £50, but only a small one. I have eleven cottages in all, which are let at 4s. a week each. Some of them have been empty at various times. I was a director of the company up to 1858. I made complaints in Mr. Fussell's time, as the minute-books will show. I believe I was one of the parties who let the works to Mr. Fussell.

Re-examined by Mr. O'MALLEY: The stable was worth about a guinea a year. I was a director of the company in Fussell's time. I left the direction in consequence of the complaints I had against the company, and I parted with my shares. I instructed my attorney in 1865 to give the company notice of action, on account of the annoyance experienced by me. The gate

on the land held under the lease of 1848 is for waggons and carts to enter at. There are no means for making people hear there. There is a bell on the small gate to which I went. Fussell was the only person whom I knew who was acquainted with the premises, and that is why I took him with me.

Mr. *Samuel Shelley*, examined by Mr. O'MALLEY.

I am the manager of the Staines and Egham Gas-Works. I have been a gas manager for more than 14 years. I know the defendants works. My brother-in-law once took them for eighteen months. He took them at Christmas, 1854, and left in June, 1856. After that I continued in the works for three years under Mr. Fussell. There was one tank when I went, and six retorts. The tank leaked a good deal. I have known it go down in dry weather as much as 18 inches in two months. The tank was about 34 feet in diameter. The water in a tank soon becomes impregnated with gas. This tank had a quantity of tar in it when I went there. Tar and ammoniacal liquor used to be pumped in together from the tar-tank when it became full. We could not sell the tar or make away with it, and it was pumped in there to prevent its flowing over the surface of the yard. The result of the tank leaking was that the soil necessarily became impregnated. There was a syphon-well near to No. 1 tank—a sort of shaft sunk into the ground for the purpose of enabling the men to go down and examine the pipe that runs below. It was 10 or 11 feet deep. It should be a dry well, but there was water in it almost as strong as ammoniacal liquor itself. It generally stood on a level with the tank. I have spoken about it to my brother-in-law, and also to Mr. Fussell.

Baron BRAMWELL: Did you ever replenish the tank?

Witness: Yes. Twice I had a lot of water pumped into No. 1 tank for the purpose of supplying the deficiency created by the leakage.

Examination continued: Several complaints were made during my time of the offensive smells from the gas-works. The late Mr. Harris and Mr. Morten have both complained to me. I know they were tenants of Mr. Tilly, who himself first complained to me. Lime was used to purify the gas during the greater part of my time. Just before he left Mr. Church had some oxide of iron, but it was laid aside for some time; and before I left Mr. Fussell introduced some more, in consequence of the great complaints of the smell. The lime in the purifying process becomes strongly impregnated with sulphur and ammonia, forming sulphuretted hydrogen, which emits a horrible odour. The men employed in clearing it away sometimes cannot stand it for more than ten minutes at a time. The purifiers were then small; they are now larger. The lime used to be changed about twice in three days in the depth of winter. When it was removed it was placed between the shed and the gates, five or six yards from the pathway, exposed to the open air. We had a lot standing there for eighteen months at one time. It used to remain till a quantity accumulated, and then it was sold to the farmers. The purifiers were generally cleaned in the daytime. The use of oxide of iron in a great measure prevents the smell. It is greatly used in London. It was used at Slough about three months before Mr. Church gave up the works. I was at the works on the 26th of February last for a few minutes. At that time they were inspected under a judge's order. They were then very different to what they had been. I never went to the chairman of the directors about the leakage. I remember Mr. Tilly coming to me, after I had been there about three months, and telling me that the water in his yard was very bad. I reported the circumstance to my superiors.

Cross-examined by Mr. KEANE: I cannot say that these improprieties were done by Mr. Church or Mr. Fussell. Mr. Fussell succeeded Mr. Church. There was tar in the tank when I first went there, and also when Mr. Church left, and when Mr. Fussell left, as far as I know. It was not taken out during the time I was there. I never saw any put in the dry well. The water sometimes accumulated in the inlet and outlet pipes, and it was pumped into the tank. We never pumped anything into the dry well. I was at the works in February last. I saw then no trace of the syphon-well; it was filled up. The pipes were there, but not the well. I never saw any other on the works. I left in 1859.

Re-examined by Mr. O'MALLEY: Mr. Fussell stated that he had the well filled up before he left. The gasholder-tank was about two feet deep with tar when I left. When the gasholder went down the tar marked it up to the first rivets. Portions of the tar would escape in the leakage. The smell of the water in the well was the same as from the tar-well.

Mr. *John Rich Fussell*, examined by Mr. BROWN.

I am a gas manufacturer living at Slough, and was in the business 16 or 17 years. I am not now in business. I took these works at Midsummer, 1856, on lease.

Baron BRAMWELL: What do you want with the lease to Fussell?

Mr. BROWN: I was going to ask whether there was any covenant in it to carry on the works so as not to be a nuisance.

Witness: I do not remember whether there was. There might be.

Baron BRAMWELL: Suppose there was, and suppose there was not, how does it affect the question? What does it matter if there were fifty covenants if he has not observed them?

Examination continued: I took the defendants gas-works in 1856, and remained there until 1863. When I went there was one gasholder and tank. Additions were afterwards made. Tank No. 1 leaked very much when I went there. It contained tar and ammoniacal liquor. There should be nothing in it but pure water. I had no accommodation on the works for storing my tar and ammoniacal liquor. There was a small tar-well, but it leaked very much, and hearing from Mr. Shelley that the tar had hitherto been put in the gasholder-tank, I did the same. I was surprised to find it contained so much, and I told the directors that it ought not to be suffered. They said they could not help it, and that they had no sale for it. In dry weather it would leak 10,000 gallons in two months—that would be a depth of about two feet. It leaked winter and summer, and we were obliged to put water into it to get the gas out. The syphon-well was about three feet from the tank; it is now covered up. By means of that well we went down to the bottom of the tank to examine the inlet and outlet pipes. We found that it leaked; we pumped the water out, and it got full again from the tank; then we filled it with clay to endeavour to stop the leak; but it did not do so. A second gasholder was made in 1859. It always leaked. Mr. Snowball did the brickwork, and some one from Exeter made the holder. The company built it, and I paid interest on the outlay. I had nothing to do with the building of it. No engineer was employed that I am aware of. The tank was put too near the old one, and one night the clay and the earth gave way. They were very near having the brickwork give way. Mr. Snowball sent some one in the night to shore it up. I spoke of the leak to Mr. Clarke and others. Mr. Clarke said he did not see it necessary that the water should be in the tank at all. He is a shoemaker. We were obliged to have two men for a day and night to fill up tank No. 2. I afterwards adopted another plan. We had some three-inch pipes laid down to get the water from the street, and we kept the tank full in that way. When it was full we let the water into tank No. 1 to fill that. I did not allow any tar or ammoniacal liquor to be put into tank No. 2. In the course of a few years the water became very foul from the gas. The soil below the tank is gravel. Frequent complaints were made about the wells. I found Mr. Tilly's well very foul from the gas when I first went. Lime was used to purify the gas. I found some oxide of iron there, and took it at a valuation from my predecessor, Mr. Church. Many of the inhabitants living near complained of the nuisance from the lime, and after a while I partly discontinued it, using it only in one purifier out of four. I was not aware of the state of the works when I went, or I should not have taken them; neither was I aware that they had been leased before. Mr. Church had had them on lease for seven years, but got tired of them; then Mr. Harding took them for seven years, but gave them up at the end of one year. After the lime was used we put it in a heap till we could sell it. We were obliged to store it close to the path along which people passed, and the wall between was low. On the 19th of November last I went with the plaintiff to the works. I heard the refusal to admit us. The foreman said his instructions were to allow Mr. Tilly to go by himself, but he declined to go alone. In October, 1867, I saw a trench dug in Chandos Street, opposite to and about five feet from the works, between them and the plaintiff's land. It was 16 feet down to the water. I examined the water, and found it was mixed with tar and ammoniacal liquor. The gravel also was smeared over with tar. The water was exactly the same as that on the works. I was at the works in February last. I saw where they were making holes to try the water, opposite the works, and also on Mr. Morten's property. There was a shaft 16 feet deep down to the level of the water. The water was impregnated as in the works, and the gravel smeared with tar. I saw a hole dug in Mr. Morten's garden, near the cesspool. I saw nothing from the cesspool; it was perfectly dry, and the gravel clean. That might be about 10 feet off.

Cross-examined by Mr. KEANE: It is very probable that I had an interview with the directors on the 14th of December, 1858. I might have told them then that the new gasholder had been completed to my satisfaction, and that I had arranged with the contractor should any defects be thereafter discovered, and that the tank appeared to be complete, with the exception of puddling about 18 inches. I remember being remonstrated with by the directors in reference to complaints made by several of the inhabitants as to the impurity of the gas supplied by me. I said it arose, on two or three occasions, from the disconnection of the pipes pending the addition to the works, and that as soon as the works were in proper order there would be no ground of complaint. I have not been on bad terms with the company. I have prosecuted them criminally before the magistrates. I know Mr. James Greenway. I have never told him that I was determined to ruin the company. I know Mr. Snowball; I have never said so to him. I have said the company were trying to ruin me. I never used the dry well during my tenancy; I do not know that it had an open bottom. I did not put tar and ammoniacal liquor into it. I did not leave it full. The person who succeeded me was a man named Keeling. I did not know the well was there till two or three years after I went. Mr. Hetherington found it; it was then full of tar, and we emptied it, and closed it up, and it was never afterwards used, except for the surface water to run in. When we emptied it there was gravel and brick earth at the bottom. It was very near the tar-well, and as that was leaky no doubt the tar found its way into this cesspool. That is the only way I can account for it. It was 10 or 12 feet deep, and there was puddle between it and the gasholder-tank.

Mr. KEANE: What did you do to keep the tank in repair, according to your covenant?

Witness: The same as my predecessors. I was not going to lay out £300 or £400 in emptying the tank. It was their duty to do that. I did no more than stop up the examination well. We found that water got into it, and we stopped it up with clay. I left very little foul lime on the place.

Cross-examination continued: For about a third of the time I was there I used oxide of iron in the purification. I always used some lime. If properly managed, there is very little difference as regards illuminating power whether the gas is purified by lime or oxide of iron. Several of the London works use nothing but lime. The Western Gas Company use lime only. The Phœnix Company use more oxide than lime.

Re-examined by Mr. O'MALLEY: Some of the London gas-works are away from the town. Where they are in the crowded districts they use oxide, and these works are surrounded with high walls. The illuminating power of gas can always be improved by improving the quality of the coals, or by taking less out of them. In the proceedings I took against this company I was successful. If the gasholder-tank had been properly constructed, no water from it could have got into the well. If there was any tar in it at the time I left, it must have arisen from leakage.

Mr. *Joseph Atkins*, examined by Mr. O'MALLEY.

I am a builder at Slough. In 1864 I was employed by the defendants to build a tank. At that time the company were themselves carrying on the works. The tank was built with clay puddle and stock brickwork and mortar. I was to fill the tank after it was made; I had nothing to do with the gasholder; that was to be fixed by other people. At the bottom of the tank five stones were placed for the holder to rest upon. Mr. Cutler was the contractor for the ironwork, and he had an accident, and let the holder fall, which smashed one of the base stones. Mr. Hetherington then employed day workmen to dig out the puddle from under the stone, and insert brickwork with common mortar. When putting up the holder a great many holes were dug in the bottom of the tank to fix the scaffolding poles in. The puddle was slightly rammed afterwards, but I consider not sufficiently so. I filled the tank with water according to my contract, and found it leaked considerably in a few days. I saw Mr. Hetherington, the secretary, and Mr. Clarke, the chairman, on the subject. They wished me to fill the tank again, and I refused, owing to their having taken the work out of my hands, and employing unskilled men upon it. They refused to pay me for a while, but afterwards paid me all but a small balance. Mr. Hetherington drew the plans and specifications himself. He is a broker, and Mr. Clarke is a shoemaker.

Cross-examined by Mr. KEANE: My brother was foreman of the work. He did not replace the stone that was broken. I think the depth of the holder was about 13 or 14 feet clear of the tank. I know the tank leaked, because two days after it was filled I found the water had sunk 2 feet below the top. I do not know whereabouts the leak was. I believe it has leaked continuously since then, but I have not been on the premises for some time. There is no doubt that brickwork absorbs water; I cannot tell at what rate, but not sufficient to account for the deficiency, because we were a fortnight filling the tank, and the absorption would go on all the time. I dare say every brick would take up a pint of water. I cannot tell who the puddling was done by after the scaffold-poles were removed; it was no part of my duty to do it. It is not the fact that I did my work so badly that the company were obliged to do the upper part over again. We milled the whole, and my specification said it was only to be trodden.

Re-examined by Mr. O'MALLEY: I consider time taken in filling the tank would allow for the bricks to absorb all the water they could take up. The dimensions of the tank were 43 by 13, and it would hold about 130,000 gallons of waters.

William Girdler, examined by Mr. BROWN.

I was in the employment of the defendants on their works in 1865, as assistant stoker. They had three gasholders at that time, and all of the tanks leaked. The big tank, which was the last one erected, leaked the most, and I had to pump water into it for two or three hours almost every day, and sometimes all day. In the summer time the water would go down in the tank a foot in three or four days—sometimes more.

Cross-examined by Mr. KEANE: I was in the employ of the company eight or nine months. During that time they sold some tar out of the smaller tanks; there never was any in the big tank that I know of.

Re-examined by Mr. BROWN: I have myself put tar in both the small tanks by direction of the manager, and also the secretary, because they had no other place to put it, and no sale for it.

Dr. *Buée*, examined by Mr. BROWN.

I am a member of the College of Surgeons, and live at Slough. I have lived there 23 or 24 years. I was a tenant of Mr. Tilly at one time in the corner house; I lived there 10 years, and left in 1859. I found the water very unpleasant; it was tainted with gas tar, so that we could not use it at all times, and we were obliged to send to our neighbours for water. It was sometimes better and sometimes worse.

Baron BRAMWELL: What did its getting better or worse depend upon—whether there was less or more rain?

Witness: I do not know.

Baron BRAMWELL: You could not trace it to any particular cause?

Witness: No; not at that time.

By Mr. BROWN: There was no smell of cesspool contamination in the water. I was living in the house before the gas-works were erected. I do not exactly recollect when I first tasted the gas in the water; it might be in 1853 or 1854. My family suffered in health; I do not know whether in consequence of the pollution of the water. I frequently perceived the smell of gas in the air; there was also a good deal of smoke from the works at times. The smell was like sulphuretted hydrogen. I know the smell arising from the purification of gas with lime; this smell was very much like that. We perceived it more when the wind blew from the north-east, which was the direction of the works, and also in the summer time, because the windows were generally open. I complained to Mr. Henry Harris, one of the then directors, but no remedy was applied. I also complained to my landlord.

Cross-examined by Mr. KEANE: I do not know whether Mr. Fussell had control of the works while I was there. I know it was before 1857 that I first perceived the smell. I have never detected sulphuretted hydrogen in the water; I have perceived a very similar smell in the air.

Mr. *Baker*, examined by Mr. BROWN.

I am a surgeon. In 1865 I lived in one of the plaintiff's houses at Slough. I took the house for one year, but only stayed nine months, on account of the disagreeable smells and bad water. The smells came from the gas-works, and the water was contaminated with gas.

Cross-examined by Mr. KEANE: The smell I perceived did not arise from the decomposition of vegetable matter; it was the ordinary smell from a gas-work.

Re-examined by Mr. BROWN: We lived very near the works, and were constantly annoyed by them, so much so that we were obliged to keep the windows and doors shut. We had to boil the well water before we could use it. The rain water in the cistern was contaminated with the smuts which fell from the defendants chimney, so that we could scarcely ever use it.

Mr. *T. G. Carey*, examined by Mr. BROWN.

I am a clerk on the Great Western Railway, and was a tenant of the plaintiff's in 1865. I took the house for twelve months, but only stayed six on account of the gas-works, the smell from which was suffocating. The water in the well was bad; I am not able to say from what cause. I only stayed in the house eight days before I gave notice to leave.

Cross-examined by Mr. KEANE: I gave notice entirely on account of the smell of the gas.

Mr. *John Boulter*, examined by Mr. BROWN.

I am a plumber, and have occupied a house belonging to the plaintiff about two years. The water in the well is very bad; it has a smell of gas tar. It is worse now than when I went into the house. The smell is very different to that of a cesspool. We cannot use it for any purpose except flushing the closet, and when pumped up into the cistern we perceive the smell all over the house. Yesterday morning about six o'clock it was worse than I have known it for months. I was present, five or six weeks ago, when a trench was opened in Chandos Street. The water in that trench had the smell of tar in it, and the gravel at the sides had tar hanging to it. I saw also a second trench opened on the right-hand side of the street; the tar there was visible, and hung to the gravel. I saw also another trench opened about a fortnight ago; the water was similar, and there was tar in the gravel. I have samples of the water here.

[Some of the water was poured into a tumbler and offered to the learned judge, who shook his head and said, "I have nothing to do with the facts." The water was then handed to the jury.]

Baron BRAMWELL: I do not think this comes within the covenant. The only way in which the plaintiff can rely upon it, and I shall so rule, is that it is a common law nuisance, and is the subject-matter of the second count. On this part of the case, supposing the jury are satisfied that there is a substantial nuisance to the people whose wells are affected by it, the only question will be whether this condition of the gravel is in any way the result of the operations of the defendants, as to which I should recommend you to give some evidence. As to the effluvia and vapours which come direct from the defendants premises, if the jury are satisfied that this is a substantial nuisance, the question under the convenant will be whether the company have done anything to prevent it, and there will also be the common law remedy in respect to that.

Cross-examined by Mr. KEANE: I have no difficulty in letting my apartments, but have great difficulty in keeping tenants when I get them. I have had people come in one week and go out the next, in consequence of the smells.

Mr. *John Currey*, examined by Mr. BROWN.

I am a builder, and occupy a house belonging to the plaintiff. The water is very bad; some weeks worse than others. I believe that may arise from the rains. Yesterday morning the smell in the air was very offensive; I had not perceived it before for several months. It came from the direction of the works.

Baron BRAMWELL: You know what the smell of bad eggs is: was it that smell?

Witness: I seldom come in contact with them.

Baron BRAMWELL: But you have smelt them in the course of your life?

Witness: I do not remember.

Baron BRAMWELL: Then you are a very fortunate man.

Mr. *Mark Duffield*, examined by Mr. BROWN.

I am an ironmonger, and live in a house of the plaintiff's, nearly opposite to his residence. There is a well at the back, the water of which is very bad. I have lived in the house about seventeen years, but only first observed it last April. It came bad quite suddenly. It is better now, but we have not been able to use it. I have occasionally perceived the smells in the air from the gas-works for many years past, and have complained of them to the chairman of the company.

Cross-examined by Mr. KEANE: I have not observed whether the water is worse in rainy weather.

Mr. *William Callway*, examined by Mr. BROWN.

I am a bootmaker, and have been a tenant of the plaintiff about seventeen years close to the works. For the last two or three years the water in the well has been very bad; it tastes of gas, and we cannot use it for the purposes of the family. It is not now so bad as it has been. I have perceived the smell from the works; I cannot say they have been so bad lately.

Cross-examined by Mr. KEANE: My well is common to the whole of the six houses in the row. I believe they are all occupied. I have smelt the smells for a long time. I pay my rent all right, and could leave the house any time I liked. I have complained to my landlord of the smells.

Re-examined by Mr. BROWN: It suits me very well to live where I do, except for the smells. There is not sufficient cottage accommodation in Slough.

Mr. *Mark Tay*, examined by Mr. BROWN.

I am a tenant of the plaintiff, and have been in the house about three years. The water in the well is polluted with gas tar. I first perceived it about eight or nine months ago. We cannot use it for family purposes. I have perceived the smell from the gas-works at times.

Cross-examined by Mr. KEANE: The water was good when I went there. I am not in the plaintiff's service; I have been.

Mr. *Charles Morten*, examined by Mr. BROWN.

I am a tenant, under lease, of the plaintiff, of a house at the corner of High Street and Chandos Street, and carry on the business of a linendraper. There are two wells on my premises. About twelve months ago I first discovered that the water in one was bad. The cause arose evidently from the gas. At the request of the defendants I gave permission to have a trench dug on my ground close to the cesspool—about two feet off. There is no sewage matter nor the slightest trace of it in that hole. The water is perfectly clear, but is strongly scented with gas. The hole is considerably below the cesspool, and about three feet from my well.

Cross-examined by Mr. KEANE: My bad well is close to Chandos Street. My good well is very near to the cottage well, which is very bad. Both were good until within the last within twelve months. I think the arrangement of the soil causes the pollution to reach one and not the other. I believe the cesspool has nothing to do with it. I have experienced a great deal of inconvenience from the gas-works during the last 10 years, arising from the emptying of the impure lime from the purifiers at improper times. Six or seven years ago it was their usual practice to do so, and no remonstrance would make them cease. That was during Fussell's lease. The inconvenience has not been so great since. When the plaintiff was about to lease his land to the company I remonstrated, and objected to the works coming there at all. There was a deputation of gentlemen waited on me, and they assured me that the Windsor works were no nuisance, and that where there were gas-works there was no fever. Mr. Tilly was one of the deputation; he was a director of the company at the time. When the trench was dug, about a month ago, the gravel down to the water level was quite clean, and showed no sign of anything having percolated through it.

Re-examined by Mr. BROWN: Ladies in my shop have complained of the smells from the works. They have not been nearly so bad since Fussell left; not more so, I suppose, than ordinarily from gas-works.

Dr. *Cooper*, examined by Mr. BROWN.

I am a physician, and have lived in Slough for 12 years, on the north side of High Street, about 130 or 140 yards from the gas-works. I have a well on my premises. About the beginning of last year the water in it became bad through being impregnated with gas products. I have perceived stenches in the air constantly during the whole time I have resided there. Oftentimes I have been driven in by them from my lawn, and been compelled to shut the windows of the house to keep them out. The last time the smell was very bad was just before Christmas. The stenches came from the gas-works. Last November I saw a small cart containing water mixed with ammoniacal liquor taken from the tank driven along the high road in the early part of the day, and I afterwards saw where it was discharged in a field. The smell was awful.

Cross-examined by Mr. KEANE: I am a tenant of the plaintiff, and am desirous of obtaining a renewal of my lease, as the house suits my purpose. If I could get rid of the stench it would suit me better. I have tried to identify the increase or diminution in the smells with meteorological changes, but could not do so. The water-bearing stratum is a great deal disturbed in its course about there. I think the gravel serrates with the clay, and consequently throws it out of its usual channel. The proximity of the Thames and the height of the water in the river no doubt affect it. Where you find gravel and clay serrated, it is rather difficult to say which course the water will take. Generally speaking, there is no such difficulty in determining the channel of the water. I should say here that the main direction would be from north-west to south-east; sometimes more westerly.

Mr. *Holmes*, examined by Mr. BROWN.

I am a member of the College of Surgeons, and have resided for seven years on the south side of High Street, Slough, almost exactly opposite to Dr. Cooper, and about 140 yards from the gas-works. There is a well upon my premises, the water in which was quite good until April last, when it became impregnated with gas. We cannot now use it for domestic purposes. I have perceived the stenches in the air more or less during the whole time I have been in Slough. They are much the same now as they were a year or two ago, and are more often bad in the night than in the day. I remember passing the defendants premises one day in last November—a very wet day—and I saw the water flowing from the road into their gasholder-tank, at the rate, I should think, of 60 gallons an hour. I accompanied Dr. Odling on his visit to the wells. During the frosty weather, I saw some very offensive fluid carted from the gas-works, and deposited in a field. It was about eleven o'clock in the morning.

Cross-examined by Mr. KEANE: I am not a tenant of Mr. Tilly.

Mr. KEANE: I think you are one of the parties who were compelled to repay some of the money which the local board expended in opposing this company's bill.

Witness: The auditor disallowed it; but the case is now before the Secretary of State, and I believe the surcharge will be allowed.

Mr. KEANE: But you are one of the parties to make up the money?

Witness: The auditor has disallowed £319, and the board have pursued the ordinary course, and appealed to the Secretary of State. On the 30th of this month the Secretary of State will send down an inspector to ascertain the circumstances attending the expenditure of the money.

Mr. KEANE: Up to this time you remain in peril.

Witness: I do not think there is much peril.

Cross-examination continued: I had not observed that the water in my well was bad previously to last April. I do not know the state of the weather at that time. Ever since I went to Slough, in 1861, I have experienced the smell from the works. I have never scientifically investigated the cause.

Mr. BROWN: Why did you oppose the company's bill?

Mr. KEANE objected.

Baron BRAMWELL: Is it a question as to the witness's credit? I do not think he has shown any *animus*. Was it a bill for the augmentation of their works?

Mr. BROWN: Yes. (To witness:) Why did you oppose the bill?

Baron BRAMWELL: Because he thought it was a bad bill.

Witness: There was a resolution of the board that the position of the works was injurious. It so happened that I was chairman of the board the night the cheque was signed, and that is the reason why I am surcharged.

Baron BRAMWELL: I think we have heard enough.

Mr. *Harris*, examined by Mr. BROWN.

I live at Slough, and my property adjoins Mr. Tilly's, which is between me and the gas-works. I have two wells on my premises, the water in which has been bad since I went there in 1859, and became worse about nine months ago. It smells of tar and gas. I have experienced the smells in the air, which are frequently very bad.

Mr. *J. S. Brickwell*, examined by Mr. BROWN.

I am a member of the College of Surgeons, and have resided at Slough 11 months. Plaintiff's property is between me and the gas-works. There is a well in my kitchen, the water of which smells strongly of tar. I saw the last trenches opened in Chandos Street. As soon as the water was reached it was found to be of a dark murky yellow colour, and smelled very strongly of tar. The stones were almost held together with tar, which formed a sort of liquid asphalte. The sides of the opening were also stained with tar on the side nearest the gas-works, as if the tar had filtered through the soil. I have not been prejudicially affected by any smell from the manufacture of gas. I have perceived it once or twice, but not more than is ordinarily the case from gas-works. Once in the summer time, when the windows were open, I perceived a sulphurous smell, which evidently came from the works.

Mr. *Ford*, examined by Mr. BROWN.

I am a member of the Slough Local Board of Health. We caused some trenches to be dug in Chandos Street, in which we found the water impregnated with gas at the depth of 15 feet from the surface. The board sent a resolution to the defendants.

Baron BRAMWELL: What was the answer to it?—so that we may see whether it has any bearing upon the case.

The following letter from Mr. Clark, chairman of the Slough Gas and Coke Company, was read:—

Slough, Oct. 24, 1867.

Dear Sir,—Upon the receipt of your Highway Committee's report, that gas tar had escaped from our works, we, as directors, have used every exertion to discover where it proceeded from, and find it is impossible effectually to go to the root of the matter without emptying the water-tank that contains the tar at the bottom. The great difficulty we have to contend with is what to do with the quantity of water which must be got away before we can get to find the leakage, and remedy the evil. The thing which suggests itself to my mind is this: If your board would allow us to run it off down your main sewer, under the superintendence of any person you may appoint, it would be *facilitating the work* VASTLY, and at the same time conferring a great favour on us, towards carrying out our earnest wishes to abate anything in the shape of a nuisance which may have unavoidably occurred.

If your board grant us this request, it cannot possibly injure your drain in any way, as it is only water quite transparent, but of course smells very strong of ammonia, as one may expect, having been confined there for sixteen years. We should syphon it out at night, in order that it may not be offensive to the public. I should say that in about three nights we could get it all away. In order that the local board may not in any way prejudice their position in granting this request, I fully admit our responsibility to any penalty which may be inflicted on us through thoughtlessly using your drain, and assure you that no attempt on our part will be made to resist any decision the board of magistrates may come to in the matter. Now, if you will kindly lay this matter before the members of your board, I shall feel very much obliged on my own as well on the behalf of my fellow-directors. (Signed) WILLIAM CLARK,

Chairman of the Slough Gas and Coke Co.

W. J. Nixey, Esq., Chairman of the Local Board.

The report of the Highway Board was also read, as follows:—

In compliance with the decision of the board, the Highway Committee have continued their labours to ascertain the cause of the pollution of the water in the various wells in and near Chandos Street and Stacey Place, in the High Street.

The board will recollect that, up to the time of the last meeting, only a few openings in the earth had been made, and these near Stacey Place only, and which were not sufficient for the committee to arrive at any definite conclusion.

The committee now report the result of two considerable excavations made near the gas-works in Chandos Street, to a depth of 15 feet, one of which being about 8 feet from the old gasometer. On reaching water, it was found to be strongly impregnated with gas tar, and was very offensive to the smell, and too much polluted for any one to taste the same. Several members of the board were present, who can testify to the correctness of this statement and the nature of the pollution, and water has been preserved for examination by the board.

The undersigned are unanimous that the water in the wells complained of is fouled by the escape of gas or gaseous matter from the gas-works in Chandos Street.

Cross-examined by Mr. METCALFE: After making that report I did not go to look at the section showing the level of the dry well. I investigated the position as to where it came from. It came from the direction of the gas-works; I have not experienced any nuisance from smells greater than usually attends well-conducted gas-works.

Mr. *H. Serjeant*, examined by Mr. BROWN.

I am surveyor to the Local Board of Health at Slough. The trenches in Chandos Street were opened under my direction. When the defendants were syphoning the water from the tank into the sewer, it was done imperfectly, and allowed to flow into the cutting we had made in Chandos Street, and I should say a great deal got into the earth in that way. That was in November last.

Baron BRAMWELL: It was after the resolution and letter?

Witness: Yes.

Baron BRAMWELL: And after the action was commenced?

Mr. KEANE: No; the action was commenced in January.

Examination continued: I have perceived the smells from the gas-works; they were very offensive. I have noticed them for some time past. They were bad before the company went for their bill in 1866. They are worse some times than at others. They are not so bad now; they have begun to improve within the last three months.

Cross-examined by Mr. KEANE: I have been inspector more than three years. I have lived principally in Slough all my life, but did not pay special attention to the matter until I was appointed inspector of nuisances.

Thomas G. Barlow, Esq., examined by Mr. BROWN.

I am a civil engineer, having offices in Parliament Street, Westminster. For upwards of 40 years I have had experience in connexion with gas-works. I visited the works of the defendants in 1854, 1856, 1863, 1866, and again last month. The object of my former visits was for the purpose of valuing the stock and the improvements made by the different tenants, as between outgoing and incoming tenants. I have thus had opportunities of knowing how the works were conducted. In 1866 I went for the purpose of giving evidence on behalf of the local board before a parliamentary committee, in reference to a bill of the company then pending. Up to the visit in 1863 I should say the works had been carried on in the most slovenly manner possible, no precautions being taken to prevent the escape of the opaque smoke when the retorts were charged and discharged. The tar and ammoniacal liquor were lying about the place in all directions. No precautions were taken to prevent nuisance from the refuse lime, which was lying in large heaps upon the ground. The nuisance from the opaque vapour might have been prevented by its being carried to a higher level than it was carried by the existing ventilating apparatus, so that it would not fall down on the adjacent property in the concentrated form in which it did fall. The proper way would have been to erect on the top of the roof of the retort-house a ventilating funnel some 20 feet high, which would have produced the same effect as a tall chimney. That had not been done up to last month. It is a practice which is adopted in most gas-works situated in localities where these fumes are liable to be a nuisance to the neighbours. Lime is the best purifying agent for gas, but it can only be used in localities where it does not itself create a nuisance. In works surrounded by houses the lime does create a nuisance. The nuisance from the purification of gas may be materially diminished by the use of oxide of iron. Oxide of iron is slightly more expensive than lime. Lime was in use for the purpose when I visited these works on the 26th of last month, and it was in use when I was there in 1866. I valued Mr. Fussell out in 1863. There was some oxide then on the premises, and also in 1856, when Mr. Church left. Lime may be used to remove the carbonic acid without creating much nuisance, if the sulphur is first taken out of the gas by means of oxide of iron. The lime is then simply converted into carbonate of lime. The defendants cannot adopt this process on their works, in consequence of not having a purifier for the purpose. The purification by oxide alone leaves the carbonic acid in the gas, which tends to diminish its illuminating power; if it is afterwards passed through lime, the carbonic acid is removed, and the illuminating power of the gas increased. There are different modes of constructing gasholder-tanks. They may be made of brickwork and puddle, so as to be sound and perfect if properly done; but, if this is not found to be sufficient, they must be coated with cement or lined with iron plates, so as to be entirely water-tight. In looking over these works, I should say there was a deficiency of water in all the tanks, which indicated to my mind that leakage was taking place. It was so when I first examined the works, when there was only one holder, and I have no doubt that all three now leak. Last month, No. 3 tank was 9 inches short of water, and No. 1 tank was entirely empty. It seems that they were then making preparations to stop the leakage, and had emptied all the water out. No. 2 tank was nearly full of water. I accompanied Dr. Redwood to take samples of water from most of the wells on the plaintiff's property. Several of them were strongly fouled with gas liquor. I also tested the water in No. 2 and No. 3 tanks, and both were saturated with ammonia and sulphuretted hydrogen.

Baron BRAMWELL: Would that not have been the case from the ordinary and proper use of the tanks?

Witness: It would not have been impregnated with sulphuretted hydrogen to the extent I found it.

Baron BRAMWELL: Do you think that by any improper usage the sulphuretted hydrogen got there to any extent?

Witness: The gas could not have been properly purified. Impure gas had been going into the gasholders.

Baron BRAMWELL: You said the water smelt of gas liquor. That is different from the tar.

Witness: It was ammonical liquor, and the vapours from the tar combined.

Examination continued: I have been present during the trial to-day. I heard the description as to the mode in which the work in No. 3 tank was done. It was a very imperfect mode. If the work had been properly done, I do not see why they should not have made a sound tank.

Baron BRAMWELL: I am not sure that you trace any damage to that.

Mr. O'MALLEY: If the water from that tank got into the wells it would be a terrible thing.

Witness: It is quite evident that No. 3 tank did leak at a certain period, and that water from that tank would contaminate any well into which it flowed.

Mr. BROWN: Is it usual to build a thing of this sort without an engineer?

Witness: There are many managers of gas-works capable of doing it, but I should have thought the company, seeing they were unsuccessful in making the first two sound, would have taken some precautions to make the third sound. The company became occupiers of the works in 1863; there was an intermediate period of three or four months when they were let to a lessee incapable of continuing them, and the company took possession in consequence. When I valued Mr. Fussell out Mr. Spice acted for the company, and it was agreed between the parties that there were 6760 gallons of tar on the premises. The tar-tank was evidently too small and they were obliged to supplement it by means of the gasholder-tank. The tar was worth £21 2s. 6d., which was carried to the credit of the outgoer. I could not tell in 1866 whether there was any tar in the tank.

Cross-examined by Mr. KEANE: When I went down in 1866 it was for the purpose of qualifying myself to give evidence on behalf of the local board, who were opposing the company's bill. Up to 1863 the works had been conducted in the most slovenly way. The great bulk of the ammoniacal liquor was emptied into the gasholder-tank, which being leaky, allowed it to escape into the adjoining soil. When I was there in 1866 the water was deficient in the tank. I can suggest no other reason than that it was leaky. If they had been pumping the tar out from the bottom, that might account for it. If they had pumped out the 6700 gallons, that would account for a depth of one foot. When I was there in 1866 a portion of the ammoniacal liquor was being evaporated under the furnaces, and what they could not evaporate was put into the gasholder-tank. I believe the effect of leakage from gas-works has been detected for 20 years afterwards, and at a distance of 1200 yards from the works.

Mr. KEANE: Can you tell me any law by which it diffuses itself into the adjoining soil?

Witness: It depends upon the quantity which flows through and the dip of the strata. Of course the further it is off the more it is diluted. It might be interrupted by a bed of clay.

Cross-examination continued: I have never known an instance where it has got into the soil in which it has been got rid of. At Slough no wells to the north-east of the works appear to be affected. If the Thames rises to some extent that would back up the water, and so keep it in the soil for a longer period, but I do not think it would have much effect upon it permanently. I did not attend the experiments with the trenches.

Mr. KEANE: If you had done so, and had found the gravel between the surface and the water-line free from tar, would you not have come to the conclusion that there had been no distribution of gas matters through the upper strata?

Witness: I should, of course, expect that in the neighbourhood of the works you would find indications of the tar and ammoniacal liquor percolating through the gravel, but as you went further off you would find them less.

Mr. KEANE: Supposing you did not find it above, but did find it in the water-bearing stratum?

Witness: That would very much depend upon the position of the trench with regard to the presumed source from which the nuisance arose.

Mr. KEANE: Supposing you found it in the water-bearing stratum for the first time, would that account for the pollution of the wells?

Baron BRAMWELL: If the tar came through the bottom of the tank alone, you might not find tar except at the bottom of the water-bearing stratum?

Re-examined by Mr. O'MALLEY: The water will follow the line of the strata. In almost every soil you find the inclination in one direction. When you get through a certain amount of gravel you come to the level of the underground waters, which make their way in an underground stream till they find an outlet, carrying the pollution they have acquired with them as long as the leakage continues.

Dr. *Redwood*, examined by Mr. O'MALLEY.

I reside in Russell Square, London, and am professor of chemistry to the Pharmaceutical Society. I have had a great deal of experience for many years in reference to gas. I examined this locality in April, 1866, and inspected the condition of a great number of the Slough wells south-west of the gas-works.

Baron BRAMWELL: I do not think there is any doubt that they are tainted, and from the gas-works. I do not know what more you want.

Mr. O'MALLEY: Nor do I.

Baron BRAMWELL: I thought I might save you and Dr. Redwood any further trouble, not to speak of any one else.

Mr. O'MALLEY: I will only ask a few questions. (To witness:) When you were examining this water in 1866, did you observe a smell from the water?

Witness: Certainly; and there is no doubt it was contaminated with gas tar. I observed the same thing again last month. It was decidedly worse on that occasion—it had altered in character. On the former occasion I failed to find evidence, though I sought carefully for it, of free ammonia in the water or of sulpho-cyanide of ammonia. On the last occasion I found both. They are both gas products, and it was for that reason I sought for them, so as to determine whether the water was really contaminated by what emanated from the gas-works. I considered this evidence conclusive. It is a very bad contamination for water. The water is perfectly unusable in its present condition. I have analyzed some of the water taken from the shafts, and have no doubt of its contamination with gas products. It could not be sewer contamination. There is a considerable escape of foul gas from the retorts when they are opened.

Baron BRAMWELL: There was no cross-examination upon that point. It was proved, and not cross-examined upon, that the proper thing to prevent this vapour falling down in a concentrated form upon the neighbouring premises, was to have a ventilating-shaft in the centre.

Mr. O'MALLEY (to witness): You know that oxide purification is the best in an inhabited locality.

Baron BRAMWELL: That is not disputed.

Cross-examined by Mr. KEANE: I found a good deal of common salt in the water. That is generally considered to be an indication of cesspool contamination. On the last investigation, I found 3 grains of ammonia altogether per gallon, and there was free ammonia to a sufficient extent to change the colour of litmus paper when suspended in the upper part of a bottle of the water. It reddened turmeric paper. I did not make an estimate of the quantity of free ammonia apart from that in combination.

Re-examined by Mr. O'MALLEY: Common salt is one of the constituents of the water in several of the wells in Slough, but perhaps there is a rather larger proportion in these. It did not come from the gas contamination. I have very little doubt, as there are many cesspools in Slough, the water may receive some of the matters from them, but this is quite a distinct thing. I have obtained abundant evidence of contamination from gas products; the other may also exist.

Mr. O'MALLEY: Is sulpho-cyanide of ammonia a product of cesspools?

Witness: Not at all.

Dr. *Odling*, F.R.S., examined by Mr. BROWN.

I am professor of chemistry at St. Bartholomew's Hospital. I have heard the evidence of the last witness, and I agree with him. I have not been on the works; I have inspected the wells. The result of my examination is of the same character.

Mr. *Tilly*, jun., examined by Mr. O'MALLEY.

I am son of the plaintiff, and assist him generally in the management of his property. I happened to discover that the defendants had tunnelled from the gasholder under the footpath, and had broken open a main sewer in the road, and had inserted a pipe connected with a syphon, by which means they passed a quantity of water out of the tank into the sewer. I was the first to discover it. I immediately went round to the gates, and got inside the works about 10 or 12 yards, when I was assaulted by the workmen and thrust off. I had them before the magistrates, and they were fined for doing so.

Baron BRAMWELL: On your own statement of the case they ought not to have been fined.

Mr. O'MALLEY: Yes; if they beat him.

Baron BRAMWELL: He did not say that.

Witness: Dr. Buée attended me for several days afterwards.

Cross-examined by Mr. KEANE: This took place last year. It was about twelve o'clock at night when I went to the works, or a few minutes past.

Baron BRAMWELL: Is it worth going into this matter?

This was the case for the plaintiff.

Mr. KEANE addressed the jury for the defendants, and submitted that, though a formidable number of witnesses had been produced on the other side, no breach of covenant had been proved against his clients under the first count of the declaration.

Baron BRAMWELL: There is evidence to go to the jury on this point. Mr. Barlow has shown that there are preventible means. The jury may not think it a nuisance of that character to bring you within the covenant, or they may think it is not preventible; but there is evidence.

Mr. KEANE said Mr. Barlow expressed the opinion that the company ought to have erected a ventilating funnel, but he did not venture to say that even if they had done so there would be no smells. There was no evidence of any injury having been done to the plaintiff by the smells from the works, and all that Mr. Barlow's evidence amounted to was this, that if there were a tall chimney the smoke would not come down in so concentrated a form upon the neighbouring property. He (Mr. Keane) did not mean to assert that there might not be a nuisance to some of the plaintiff's tenants, but this was not a covenant against the whole world. It was a covenant that they should, to the utmost of their power, "prevent all noisome effluvia from the matters to be made or used in the manufacture of gas upon the said land from escaping and becoming offensive to the occupiers for the time being of the premises belonging to the plaintiff which adjoin the said land." Mr. Barlow's evidence, he submitted, did not make out that there was any preventible nuisance to the tenants of the plaintiff. As to the first ground of complaint—that the ventilation was imperfect—he would prove that such was not the case, and upon the whole he should contend the complaint did not fall within the covenant. It was not a covenant against the ordinary smell of a gas-work, which was all the nuisance Mr. Morten, one of the plaintiff's own witnesses, said he had perceived. Of all the cool things he had ever heard, he thought this was the coolest. Mr. Tilly, himself a director of the company for many years, let this land to the defendants for the express purpose of a gas manufactory, and then turned round and complained that he was a sufferer from their operations, and determined, as he had said, to ruin them, making himself a tool in the hands of Mr. Fussell, who was under a covenant with the company to repair, which it was evident he had never fulfilled. The real delinquent, if they were bound by their covenant, was Mr. Fussell, who stood convicted on Mr. Barlow's evidence of gross misconduct in the management of the works. The case for the defendants was, that whatever mischief existed to the wells of the neighbourhood was done by Fussell; that the contamination of the water did not arise from leakage of the gasholder-tanks, but from the dry well. When Fussell left the works, this well was found full of gas tar and ammoniacal liquor, and there being no concrete or puddled bottom to this well, there was sufficient evidence to satisfy the company that those products had percolated through the earth, and thus obtained access to the water-bearing stratum. It was known that such matters having once impregnated the soil, would go on diffusing themselves through a great distance and for a long period of time. Examinations of the ground had proved that in the stratum above the water-level there was none of this poisonous matter, and that on reaching the water-line there was evidence of the characteristic smell which was found in the samples of water produced. If that were so, his argument was that, except from something like that which was found in the dry well, the water in the water-bearing stratum could not have become contaminated. He admitted that the wells were tainted; the great question was by whom were they tainted, and he submitted that the theory he had enunciated would be found to be the correct one. It had been contended on the other side that the gasholder-tanks were leaky. He should be able to show that this leakage existed not in reality, but in the imagination of the witnesses on the other side, and that the company had taken every possible precaution to make those tanks perfect. It must be remembered that there had been no examination of those tanks—all the statements made were inferences. And there was another thing very remarkable. They had heard of the frightful smells emanating from these works, but no witnesses had been called to prove that these emanations produced any discoloration. It was to be supposed that sulphur would retain its properties in the neighbourhood of Slough just as it did in other places, and one of those properties was its power to discolour things exposed to its influence.

Mr. *Thos. Edgington*, examined by Mr. METCALFE.

I am an architect and surveyor, residing at Windsor. I have made a survey of the company's works. On the 3rd of this month I accompanied Mr. Snowball, one of the directors, to make an examination of the puddling under the tank No. 1. I found it very good. I did not search much for leakage. I dug a little hole to get some clay out for my own observation. Since the action commenced I had a cutting made in the road, nine feet from the tank. I carefully examined the soil, but I found no trace of tar or gas refuse until getting to the water-bearing stratum. The intervening earth close to the tank was clean and free. A few inches below the level of the water the gas contamination was found. We also dug down below the bottom of the dry well. I had about four inches of gravel dug out; that seemed to be the water level. I found tar in abundance. The well was emptied when I saw it. I have never seen anything in the well.

Cross-examined by Mr. O'MALLEY: I understand levelling. I levelled down to Mr. Morten's ground. My son assisted me, and one of my clerks.

Re-examined by Mr. METCALFE: The four inches of gravel between the bottom of the well and the water-bearing stratum I found marked with tar, as though something had gone through and saturated it.

Mr. *T. Edgington*, jun., examined by Mr. KEANE.

I have heard the evidence of my father. I assisted him in his investigation. I agree in all he has stated.

Mr. *Snowball*, examined by Mr. METCALFE.

I am a builder, and have carried on business in Slough for 24 years. I have known the gas-works from the commencement, and am now one of the directors of the company. I remember the works being constructed—in fact, I tendered for them. I saw the original tank constructed. In my judgment it was done well; nothing could have been better. I do not believe it has leaked since. In December, 1858, I was employed by the company to erect the second tank, and I superintended the puddling of it. It was perfectly well puddled with the best blue clay produced in the neighbourhood. In my judgment there was no leakage except from evaporation and the soaking of the bricks. The water could never get through the puddle. In the first tank there was originally a small well within the puddling—the one which has been spoken of by the witnesses as the syphon-well. The puddling enclosed that well also. I remember the third tank being made by a person named Atkins. That was constructed upon the company's own freehold. I noticed the way in which the puddling was done. It was done very well except a small piece at the top, which I finished after he left and made perfectly free from leakage. Since Fussell left the works have been very well conducted. There has been very little accumulation of lime. The tar has been sold and sent away. Before being sold it is put into a tank constructed for the purpose, lined with slate, and puddling outside, so that it is impervious to everything. The ammoniacal liquor goes into the same tank. After complaints had been made I assisted in making cuttings for the purpose of ascertaining the cause of the pollution. No indications of discoloration were found before coming to the water-bearing strata. The stratum between the bottom of the dry well and the water-bearing stratum was found to be very much marked with tar. If the tanks had leaked in any way the immense pressure of water on the clay would have caused the water to rise in the shafts made by the local board to a level with the top, and that has never taken place, proving that the tanks are impervious.

Baron BRAMWELL: I ought not to offer an opinion, but I should think the leakage might go on, and pass by the underground channels without rising in the shafts at all.

By Mr. METCALFE: I have examined the tanks themselves. I do not believe there is any leakage in them. I have here a piece of the puddle, which I cut out to show the character of the clay, and that there is no oozing of gas refuse through it. I saw no crack or flaw in the workmanship. My

attention was called to the dry well in 1863, as the water from the yard would not run off. I found on examination that the well was full of tar and water. This was taken out, mixed with refuse lime, and carted away. It was very hard at the bottom, and must have been there some time. When we emptied the well, we found it had an open bottom, but it was hard from the settlement of sand, lime, coal dust, and other things, which had washed in and formed a kind of concrete. Just after Mr. Fussell took to the works the well was opened, and was then quite dry. A communication was opened so that the yard drainage could drain into it. No gas tar was then to be seen.

Mr. METCALFE: Did Mr. Fussell say anything to you as to what he would do to the company?

Witness: Yes; he said he would ruin the company.

Cross-examined by Mr. O'MALLEY: I have not been engaged in the building of any other gas-works, but I have built many tanks. My opinion is, that No. 1 tank never did leak. I am not aware that the company ever repaired that tank inside. I never applied to Christie and Co. about it. I do not remember a man coming down from London, of the name of Williams, who said there was not 3 inches of puddle at the bottom. I attended a meeting of the local board on the 14th of October last.

Mr. O'MALLEY (reading from a local paper): "Mr. Snowball, as one of the directors, was quite certain that they were quite ready to do efficiently what was requested. There was no demur to the matter at all; the directors were as ready as the members of the local board to remedy the nuisance of which the district complained. In reply to a question, he said that gas tar had been poured into the gasholder-tank by the company and by the lessees, and there were 2 feet of tar in it." Is that correct?

Witness: I might have said there were 2 feet of tar in it; but I never said we had poured it in.

Baron BRAMWELL: You know the assistant stoker Girdler?

Witness: Yes.

Baron BRAMWELL: You heard what he said about pumping water into the tank for two or three hours a day?

Witness: Yes.

Baron BRAMWELL: I suppose that could not be necessary unless there was leakage?

Witness: The absorption would make such pumping necessary with a new tank.

By Mr. O'MALLEY: I never heard that gas tar was put into the tank in 1866. I got into the tank, and examined the bottom of it. There was a layer of tar upon it, as though a paint-brush had gone over it. I do not know how many gallons were got out. The tar tank was built about 12 years ago. The slate lining was put in about two years since. That was done because of the complaints of leakage, and the directors could not tell from whence it came.

Re-examined by Mr. KEANE: I never believed it, and no one will ever make me believe it. It was simply to satisfy the public.

By a JUROR: The dry well was full up to the level of the dome.

Mr. *J. E. Hetherington*, examined by Mr. KEANE.

I am the secretary of the company. The works were commenced in November, 1848, and the company carried on the business themselves till 1853. So far as I observed the construction of the works up to that time they were correctly done. The designs were prepared by Mr. Thomas Sharp, of Northampton, gas-engineer, and carried out by Messrs. Eunson, of Wolverhampton, and Mr. Bedborough. The works were subsequently leased to Mr. Hardy, Mr. Church, and Mr. Fussell. The dry well was made in 1854, to receive the rain water from the buildings and the yard. The bottom was unpuddled, allowing the water to soak away. The second tank was made in 1858, under the instructions of Mr. Vickary, of Exeter, the contractor for the holder. Mr. Kealing succeeded Mr. Fussell. On visiting the works at various times, during his occupancy, I saw tar and ammoniacal liquor lying on the surface of the ground. It must have got into the dry well, because it had gone nowhere else. The existence of tar and ammoniacal liquor in the well was first known to the company immediately after Mr. Kealing left. A heavy shower of rain came on, and the retort-house being lower than the yard, the water ran into the retort-house, and nearly put out the fires. We immediately opened this dry well or cesspool, and found the entrance to it choked full of tar and water up to the spring of the dome. It took four or five days to empty it. The bottom was found to be thick tar, with sand and rubbish that had gone in with the drainage. It was then closed up, because we thought some tar might leak through the sediment at the bottom and impregnate the springs. The bottom of the well must have been in the condition in which it was found for a long time. I think the contents of the well would get through to the water-bearing stratum.

Cross-examined by Mr. O'MALLEY: I think there were about 6 feet of tar at the bottom of the well, and water on the top of that. No water could have passed through it for months; it was effectually puddled when I saw it. I am an auctioneer and appraiser, and fill various public offices, among others that of assistant overseer. We discontinued pouring tar into the tank No. 1 last Michaelmas. It was the receptacle for the tar till that time. The ammoniacal liquor was never put into it; it was put into a separate vessel and carried away in casks. A new brick tank, slated inside, was built for that purpose in April, 1865. We never had a man named Williams down to examine this tank, nor any one from London to examine the works.

By the COURT: I know Girdler. I say decidedly he never put any tar in No. 2 tank. He certainly did pump a little water into No. 3 tank. I swear that his statement is not true.

Mr. *Jno. Kealing*, examined by Mr. KEANE.

In June, 1863, I took these works, and remained there till the 8th of November the same year. I know the dry well. I never put anything into it. My knowledge of its existence has arisen since I left. When I went into possession the gasholder-tanks were the same as other tanks for anything I could see. I presumed they were sound; I saw no indication of leakage.

Cross-examined by Mr. O'MALLEY: I heard that there was a pipe from tank No. 1 to the road, but I did not observe it.

Re-examined by Mr. KEANE: I saw no flow of water to indicate there was such a thing. I heard some of the men say there was something of the sort. If it existed it must have been blocked up.

Mr. *William Hardy*, examined by Mr. METCALFE.

I live at Uxbridge, and was a gas-works contractor. I took possession of these works under lease in 1854. I did not find any leakage in the tank to speak of. If it did leak it was very little indeed, for in the twelve months I had the works I did not pump in water more than two or three times. The gasholder rising and falling would cause some evaporation. I should say the tank was properly constructed. In the centre of the yard there was a cesspool. We did not use it for anything but the surface water.

Cross-examined by Mr. O'MALLEY: I held the works for twelve months. I had the option of giving them up at the end of three months. I had bad luck with my coals.

Re-examined by Mr. METCALFE; I have erected works at Ashby-de-la-Zouch, Banbury, Daventry, and Salisbury, and I had the conduct of the Belfast works.

Mr. *Herbert*, examined by Mr. KEANE.

I am a bricklayer, and was employed by Mr. Bedborough as sub-contractor for building the Slough Gas-Works when originally constructed. I built the first tank. It was built in a sound and proper manner. It was puddled all round and at the bottom with clay properly prepared. I have never been on the works since. I was there for several weeks after the tank was filled with water. It was then perfectly sound, for it absorbed a certain quantity of water and was filled again. There was no leakage whatever, and no complaint of any while I was on the works.

Mr. *William Clarke*, examined by Mr. KEANE.

I live at Slough, and am chairman of the gas company. I have been a shareholder from the commencement, and have seen a great deal of the works. I distinctly say the tanks do not leak. We have tried every means to ascertain the cause of the nuisance complained of. I am sure what the cause is—it is the dry well. The moment I mentioned it to our solicitor, he said, "That's the mischief." It is the only place where we could find any traces of gas going down through the strata to the water-level. We had an opening cut into the tank No. 1. After cutting two or three inches through the puddle the water was free from tar; but on getting to the water-bearing stratum there were regular nuggets of tar, and tar swimming on the top of the water. The dry well is at a higher level than tank No 1, and the water would flow into it. The tank lies between the dry well and the plaintiff's house. The water was contaminated under the dry well, and as far as we could see it began there. We have a water well on the works above the dry well, the water in which is perfectly pure. There are three wells in that direction, all of which are pure, and one of them is not far from the large gasholder.

By the COURT: There has been no trench or shaft driven over against the second tank.

By Mr. METCALFE: No tar has been put into that tank. There is no accumulation of lime on the premises. There was a great quantity when Fussell went.

Cross-examined by Mr. O'MALLEY: We first found out that the dry well was the source of contamination about a month ago. Before then we thought it arose from the cesspools. When I saw the dry well there was nothing but gravel at the bottom. It looked as though it had been dry for years.

Re-examined by Mr. KEANE: In fact it had been dry since 1863. I did not observe any gas tar round the sides.

Mr. KEANE: You suggested to the solicitor that it was the dry well, and said it was so?

Witness: Yes.

Baron BRAMWELL: Quite right, Mr. Keane; they found truth at the bottom of the well. (To witness:) I want to ask you, as a man of ordinary common sense, do you suppose that the bottom of this dry well has been filled up with what we may almost call dry stuff for some time?

Witness: No, I do not mean to say that; but there was loose gravel at the bottom.

Baron BRAMWELL: Do you think anything would percolate through it, and get into the water channel?

Witness: What I saw showed me that the soil was charged with it.

Baron BRAMWELL: I understood your secretary to say that the stuff at the bottom had got hard. That is all taken away, and you have removed the gravel at the bottom. What is there now to affect the water that passes up through that well?

Witness: My impression, when I saw the tar and water flowing in, was that right round the bottom of the dry well the soil was surcharged with tar.

Baron BRAMWELL: I see what you mean—that the soil round the whole of the well is saturated with this matter, and gives it out occasionally as the rain water falls through it, carrying it down into the water-bearing strata?

Witness: Yes.

L. W. Pritchard, Esq., examined by Mr. KEANE.

I am engineer to the Western Gas-Works at Kensal Green, and am thoroughly acquainted with all matters affecting gas manufacture. I have examined the gas-works at Slough, and, so far as I have been able to observe, there is nothing but what may be fairly expected in such works—nothing but what is inevitable in gas-works. I am acquainted with the City Gas-Works at Whitefriars; also the Equitable Gas-Works at Pimlico, and others. I find that the effluvia from the works at Slough does not at all exceed others.

Baron BRAMWELL: I suppose we must ask the question which Mr. Barlow suggested, whether there ought to be a ventilating-shaft.

Witness: There are the usual ventilating louvres for small retort-houses. No doubt it would be an improvement to have a tall chimney.

Examination continued: I say that lime is the best material for purifying gas, depending, however, upon the practicability of using it and the cost. The illuminating power of the gas is better when the lime is used. I use nothing else at the present time at Kensal Green. I went over the Slough works in November, 1867, and it appeared to me they were very fairly conducted. I recommended that the puddle should be cut through to the gravel at the bottom of the tank, to see if any tar had passed through. There would have been traces of it had such been the case, but I am informed there were none. I have not the slightest doubt that the contamination of the water arises from the dry well. The gasholder-tanks were well constructed, as far as I could see. I did not observe anything which would lead me to infer there was leakage.

Mr. KEANE: I wish to know whether you agree with Mr. Barlow as to the diffusion of the taint through the earth? You heard what he said; do you agree with him that, for a series of years, this diffusion may go on underground?

Witness: I do. In my opinion the pouring of the tar into the dry well for years would account for the nuisance.

Cross-examined by Mr. O'MALLEY: You think that the refuse tar running for a few days into that well would for twenty years saturate the soil of the neighbourhood, and account for all the nuisance?

Witness: I think so, according to the quantity put in there.

Baron BRAMWELL: He starts with the hypothesis that the dry well has been half filled with tar.

By Mr. O'MALLEY: We have used nothing but lime at the Kensal Green works since November last. Some of the other companies use lime partially. We have resorted to lime on account of the peculiar coal used. We use cannel coal containing a large quantity of impurities, which could not be taken out with oxide of iron. The waste lime is now accumulating on the premises in an open space. That is not, perhaps, desirable; I would rather sell it. It does not affect the neighbourhood in any way during the process of removal. In the City Gas-Works they use oxide of iron for purification to avoid nuisance. We have large ventilating-towers at our works. It is not an ordinary practice.

Baron BRAMWELL: This gentleman admits it would be better to have them, but he says it is not usual in small country gas-works.

Mr. *Hetherington* recalled, said, in answer to Mr. KEANE: We use 95 per cent. of New Pelton coal and 5 per cent. of cannel. Our standand of illuminating power is 14 candles.

Baron BRAMWELL (to Mr. Pritchard): Can you tell us whether the works at Slough are such that they could use the oxide of iron in an advantageous way, or whether they are obliged to use lime? I think Mr. Barlow said that, for some reason or other, they could not use oxide of iron.

Mr. O'MALLEY: He said they could not use the two together.

Baron BRAMWELL: That is, not the two in combination; first the oxide, and then the lime.

Witness: It would cause great inconvenience; they could use them, but not with advantage.

Baron BRAMWELL: No one has told us what they do. (To Mr. Hetherington:) Do you use the oxide?

Mr. *Hetherington:* No. The directors took the advice of Mr. Pritchard, and he recommended them to use lime. We cart away the lime as fast as we can.

H. Brothers, Esq., examined by Mr. METCALFE.

I am the engineer of the Equitable works, at Pimlico. I have examined the Slough works, to ascertain if they were correctly built. I saw them in 1866, and again this year. In my judgment, the tanks are properly constructed and the works well conducted. The use of lime for the purification of the gas is the proper thing. In the Equitable works we use both lime and oxide. We do not use lime with common gas, but only for purifying cannel gas. In the Phœnix works, one of the largest in London, they use lime. I consider the Slough works, when I visited them, were very free from smell. I have had a very large experience, and, in my judgment, they are fairly and properly conducted. I found no accumulation of lime or refuse on the premises.

Cross-examined by Mr. O'MALLEY: I was examined before the committee of the House of Commons on the Slough Bill. I do not recollect whether I stated on that occasion that the dip of the land was from the most populous part of the town down to the gas-works. I told the committee on that occasion that the water from the wells was good drinkable water. I produced samples of the water, and the chairman tasted them. It is very probable I told the committee that I had examined several of the walls in the neighbourhood, and that the water was good and without any smell; if I did say so it was true. I did not say that the Phœnix Company used no oxide of iron. To the best of my belief they use lime at the Vauxhall station.

Re-examined by Mr. KEANE: My answer to the committee very probably was that the land appeared to me to slope down.

A specimen of the soil taken from the water-bearing stratum beneath the dry well was produced. The stones appeared shiny with tar. In answer to the jury, Mr. *Edgington* said that 6 inches above the water the soil was not impregnated.

Henry Letheby, Esq., M.B., examined by Mr. KEANE.

I have visited the Slough Gas-Works. They appeared to me to be as well conducted as country gas-works usually are. The ventilation of the top of the retort-house was by the usual method—that of having a long opening from one end to the other of the roof, with louvres to allow of the escape of the smoke. It would very much improve these, as it would all other gas-works, to carry the smoke away by means of a shaft, but it is so unusual a thing that I should hardly say it was necessary. There is always some smell from gas-works, even under the best circumstances, but that smell is not necessarily injurious to health. We have no evidence that it actually injures health, except under very extraordinary circumstances, as when the works are very badly managed. In London, where perhaps they are better managed than in any other part of the world, there is always a smell in the neighbourhood of the works. I carefully examined the Slough works; the effluvia was very much like that of gas-works generally. The tanks appeared to me to be all right, but that is an engineering question, upon which I would hardly venture to give evidence.

Mr. KEANE: You have seen the sections of the tank and well. Can you draw any conclusion from them as to the cause of the impregnation of the water?

Witness: Yes. At the time I was on the premises and made an examination of the matter, my opinion was that the well which has been called the dry well, but which had contained tar, was the real cause of the nuisance. I have observed nothing in the sections which shakes my opinion on that matter.

Baron BRAMWELL: I don't think it is within Dr. Letheby's speciality.

Witness: To judge of the influence of a dry well upon the soil I think is quite within my speciality.

Baron BRAMWELL: Then you think it quite possible the mischief may arise from the dry well?

Witness: I think so. I have had occasion to inquire into a great number of cases of pollution from gas-works, and think I may speak with confidence.

Mr. KEANE: Supposing it had arisen from one of the tanks, should you have expected the soil between the surface and the water-line to be free from pollution?

Witness: No. I should have expected, if it arose from leakage in the tank, which is at a higher level than the dry well, that the gravel above the level of the water-line would be tainted. They were cutting one of the sections in the road when I was there; the gasholder-tank No. 1 was empty, and I saw the opening made. There was no indication of the presence of gas tar. I followed very carefully the course of the pollution. I found that two wells on the north-eastern side of the dry well were untainted, whereas all the wells along the line towards Mr. Tilly's property were tainted with gas refuse.

Baron BRAMWELL: The tar in the dry well must have stood at a greater height than the tank?

Witness: No doubt; but, standing as it did upon the water-bearing stratum, I apprehend as the tar escaped it was carried along it.

Baron BRAMWELL: If so that was a temporary cause, and the cleaning out of the dry well put an end to it?

Witness: No, my lord; where it has once got into the soil there it will remain for years and years, and taint the water.

Baron BRAMWELL: You do not think the gravel immediately around the dry well is saturated?

Witness: It may be, to some extent; but, as the tendency of such saturations is to fall away, at some little distance it would be at a level with the water-line.

Mr. KEANE: Does the fact that the wells in one direction are tainted and not in the other confirm your opinion?

Witness: Yes; the conclusion I formed was, that the water flowed in that direction towards the river.

Mr. KEANE: It seems, if I understood aright, to begin there.

Witness: It would seem so, for this reason, that the two wells which are on the other side are good.

Baron BRAMWELL: Might not the fall from the dry well have reached it in that way?

Witness: It did not; it might, and there would have been an explanation if it had. But, as those wells are free from pollution, I believe the source of the pollution is to be found on the other side.

Mr. KEANE: Supposing the dry well to have been used as stated for two or three years, that would entirely account for it?

Witness: There is no doubt about that.

Mr. KEANE: Would it be the tendency of the tar to form a sort of concrete at the bottom?

Witness: Yes; water has a tendency to dissolve the lighter portions of the tar, and to consolidate and form pitch of the other.

Cross-examined by Mr. O'MALLEY: I do not apprehend the tar exists in such quantities as to form a concrete between the dry well and the water wells. Supposing the dry well to have been full of tar, it might have stained the stones along the line of its flow a hundred or a thousand yards. The water might be polluted by it all the way to the Thames, and it would carry globules of tar along with it. I did not know that the well in the company's yard was at one time contaminated. The only time I was on the works was the 17th of last month. I think they then showed me the dry well. I did not know anything about the shaft at Mr. Morten's, between the well and the cesspool. I did not go to Mr. Morten and tell him that the pollution of his well arose from his cesspool, and did not suggest the opening of a shaft there; it is quite a misunderstanding.

A JURYMAN: It is supposed this dry well contained tar in 1863. How can you account for the water being more impregnated now than it was then?

Witness: The water at one time will reach the bottom of the deepest wells, but not the bottom of the shallow wells; but when there is a flood in the river, or a season in which there is a great deal of rain, it reaches the shallow level. Lately we have had seasons of great flood, and I take this to be the explanation of the fact that many of these wells have been reached which were not reached before.

Baron BRAMWELL: I understand you to say the shallower wells might be reached because the river water may have been raised by not finding an outlet into the Thames; but how comes it that the water itself is fouler, less useful, and more noisome than it used to be?

Witness: I cannot account for it; but there is a similar case at Bedford. The water in a well there was worse in 1867 than in 1861, though the gas-works have been removed away from the place in the interval.

R. H. Barrett, Esq., examined by Mr. METCALFE.

I am a solicitor living at Slough, and have been a tenant of the plaintiff for two or three years. I have never experienced any nuisance from the gas-works. In my judgment the works are conducted as well as most works are.

Cross-examined by Mr. O'MALLEY: I am the ordinary solicitor of the company, but am not appearing in this case. I have never refused permission to take water from my well. We do not use the water of that well for drinking purposes.

Mr. *Henry Langley*, examined by Mr. METCALFE.

I am a schoolmaster, and have lived at Slough for 25 years. I have been a tenant of Mr. Tilly for two years. I have never experienced any nuisance from the gas-works. There is an offensive smell from the wells. I think the gas-works are conducted in a proper manner. I have 25 boarders and 50 day scholars and three of my own children in the house. One of my own children is the only person that is ill.

Cross-examined by Mr. O'MALLEY: I now live in Church Street, at a good distance from the works. I left the plaintiff's house in December, 1866.

Mr. *Greenaway* was called, and asked by Mr. METCALFE about something said by Mr. Fussell while witness was engaged in laying some pipes; but Mr. O'MALLEY objected, and the COURT ruled the question could not be put.

Mr. *Brummell Smith*, examined by Mr. METCALFE.

I am a solicitor, residing at Windsor. I was concerned for the men whom Mr. Tilly summoned for the assault upon him in November last. On that occasion I saw Mr. Tilly, sen., and he said, "I understand the men have treated Henry shamefully. I have looked at the covenants of my lease; they are much stronger than I expected. I shall give them notice, and get rid of them."

This was the defendants case.

THURSDAY, MARCH 12.

Mr. KEANE summed up the evidence for the defence. He asked, in the first place, whether, in the opinion of the jury, this was an action brought in good faith. If it were the result of a sensible grievance, long endured, and weighing down the owner of the property, one could understand it; but if, on the other hand, it was a fanciful grievance, taken up out of some illusion, pursued vindictively, a jury was probably, of all institutions in the world, the best tribunal for detecting it. Now, there was no complaint before Mr. Fussell got possession of the works. Mr. Fussell was the principal witness for the plaintiff, and he was a man who seemed to be at perpetual enmity with the company, and he was the man whose management of the company's works Mr. Barlow had denounced as slovenly and improper. The plaintiff himself, although in 1865 he made a complaint of the company, suffered that complaint to slumber, until his son, going upon the works late one night in 1867, was, as he (Mr. Keane) considered, very properly turned out. He then brought the present action against the company for damages, and another action for the purpose of ejecting them from their premises. To his mind, it appeared to have been abundantly proved that the company had done nothing of which the plaintiff could reasonably complain. The action had evidently been brought for a sinister purpose, with a view of destroying the gas company, which had invested its money in improving and benefiting the town of Slough. The first count was founded upon the covenant of the lease requiring the company to do their utmost to prevent noxious effluvia escaping to the injury or annoyance of the tenants of the plaintiff. What could be done that had not been done by the company for that purpose? Nothing additional had ever been suggested except a tall shaft, and no one had ventured to state that such a shaft was ever heard of in connexion with small country gas-works. The jury would not consider what might possibly be desirable in a large and densely populated town, but what was reasonable under all the circumstances. All that Mr. Barlow said was that such a contrivance would be an "improvement;" he did not consider it absolutely necessary. It would not absolutely prevent the effluvia if it was adopted, and the extent of the benefit conferred would not be commensurate with the expense it would involve. With regard to the use of lime, it was clearly proved that that agent was used for purifying gas in many large works, and it was no adequate ground of complaint. The second count was not dependent on the agreement, but on what was called a common law nuisance—namely, the pollution of the water. To establish that it must be shown that the defendants were the authors of the pollution, and this the plaintiff had failed to do. Mr. Clarke had proved that between the gasholder-

tank and the water-bearing stratum there was no taint. On his examination of the dry well, it was found to be dry at the bottom. Mr. Keeling said he put nothing into the well; but obviously Mr. Fussell did. Below the well the water was found to be tainted and the stones smeared with tar. Dr. Letheby said that the tar might go on diffusing itself for years through the ground, and Mr. Barlow admitted that it might extend to the distance of 1200 yards. The water in the wells on the north-east, in the company's premises, was found to be pure—a circumstance that strongly confirmed the defendants theory. As soon as the dry well was ascertained to be full of tar the company emptied it, and they had never permitted any accumulation since. With regard to the evidence of Girdler as to pumping into the tank, contradicted as it was by Mr. Hetherington, he thought it would not be credited by the jury. With reference to the entry upon the premises, he had hardly thought it necessary to trouble the jury upon that point.

Baron Bramwell said he should rule, as to that point, that there was no case to go to the jury.

Mr. Keane said he should leave his case with the jury not without some anxiety, and not without some confidence—the confidence arising from the great attention they had paid to the evidence, the anxiety from the feeling that this was an action which, with the action for ejectment, was intended to ruin and destroy the company, and perhaps to substitute another company upon its ruins, and to gratify the malignant feelings of Mr. Fussell on the one hand, and the outraged feelings of Mr. Tilly on the other, who he believed would never have brought his action if the manager of the works had permitted Mr. Tilly, jun., to go in at night and deport himself as if he were a feudal lord, and they his vassals whom he might trample upon and despise.

Mr. O'Malley replied on the part of the plaintiff. He began by complaining of the terms in which his learned friend had addressed the jury in reference to a case in which he should have thought hard words might well be dispensed with. As to the concluding observation made by his learned friend, he remarked that the time when Mr. Tilly, jun., was assaulted was 1867, and the first letter written by the plaintiff's solicitor to the defendants, calling attention to the terms of the lease, was in 1865. If the company had been dissatisfied with the manner in which Mr. Fussell had managed the works, they could have put an end to his lease at any time; but they never did so, permitting him to remain for the whole period of the lease. With regard to the first count under the agreement, he (Mr. O'Malley) maintained that the defendants were not only bound to use all ordinary means of preventing noxious effluvia; but if those were insufficient, and others were available, they were bound to have recourse to them—in short, to do "the utmost in their power." It was idle to contend that the witnesses were mistaken in saying that the works had given forth the most noisome effluvia; and the question for the jury was whether the company had done its best to prevent them. If they had not, the plaintiff was clearly entitled to a verdict. In truth, they had taken no more precaution than was taken in the commonest retort-house in the remotest village in the country. With regard to the well, it was empty when Mr. Fussell entered upon the works, and it was full when he left. Obviously, it might have oozed in from the tank or from the tar-well. That the latter was not water-tight was proved by the fact that in 1865 the company went to the expense of lining it with slate. But to suppose that the contents of the dry well could have escaped and found their way so great a distance as Dr. Cooper's house was a simple absurdity. But instead of diminishing, the evil had been on the increase, which could not be the case if the well was the source of contamination. Had not the plaintiff satisfactorily accounted for the pollution? It was all very well for Mr. Snowball to declare so positively his belief that there was no leakage. He was evidently deceiving himself. Evaporation could never account for so much waste, especially when the influence of the rainfall in supplying the waste was taken into consideration. Unless the defendants witnesses had been swearing falsely, there was continued leakage from the tanks, and that was the only possible source from which the pollution of the water could arise. The absorption of water by bricks had been relied on by the defendants; but that was inadequate to account for the facts, since the bricks had time to absorb all the water they could during the slow process of filling the tank. With regard to the damage sustained by the plaintiff, it had been proved that his houses had diminished in value, and some of them had remained empty for a considerable time. He did not desire aggravated damages, but he was certainly entitled to substantial compensation for the injury he had received. He had offered to refer the matter to some competent authority to say what should be done; but the company had refused to listen to any arrangement that could be suggested, and the only course left to the plaintiff was to ask a jury for damages for the injury that had been inflicted on him.

Baron Bramwell then summed up the whole case. He said, with respect to the non-admission of the plaintiff and Fussell to the premises, which was a trumpery matter, he should at once rule against the plaintiff. The first claim made in the declaration was founded upon the covenant which the defendants had entered into with the plaintiff, that they would to the utmost of their power, from time to time, as occasion might require, prevent all noisome effluvia from matters to be made or used in the manufacture of gas upon the land demised by the plaintiff to them, from escaping and becoming offensive to the occupiers for the time being of the premises belonging to the plaintiff and adjoining thereto. The plaintiff brought his action upon that covenant, and he said, "You have broken this covenant; you have not prevented the noisome effluvia from escaping, and becoming offensive." Upon this point he should rule that the covenant did not extend to the pollution of the contents of the wells. All that the plaintiff was entitled to under that count—if he was entitled to anything—was for the damage arising from the use of lime, and for not having a proper contrivance to carry off the gas from the retorts, or what escaped from the retorts in the process of charging and discharging, and for any other nuisance which might arise; as, for instance, the carting away of the ammoniacal liquor at inconvenient times and in an improper manner. And upon this also he would remark that the plaintiff was only entitled to recover for such damages as he himself had sustained. The jury must not give him damages for any inconvenience his tenants were put to, because those tenants might bring an action if they saw fit. The first question was whether there had been noisome effluvia from matters made upon the land; whether that noisome effluvia had escaped and become offensive; and whether that had been so in spite of the utmost efforts of the defendants—whether they had to the utmost of their power endeavoured to prevent it. For he need not tell the jury that, though the words of the covenant were very strong, they did not bind the defendants to do anything that was irrational. It did not mean that they were to cover their works with a glass-house, or conduct their operations in such a way that no possible smell could escape. There must be a practical interpretation given to the words, and not such a one as would render the manufacture of gas impossible. On the other hand, the company could not say that they were not bound to do anything because it would cost them money, or might put them to some inconvenience. The covenant must have a rational interpretation, and if the company could manufacture gas in a less offensive way they must do so. On the one hand, it did not mean that they were to be as offensive as possible, if offence was preventible; on the other hand, it did not mean that they were bound to take such measures as would make the carrying on of their business impracticable. The question which the jury had first to decide was—"Has there been a nuisance from the escape of noisome effluvia?" Well, that was a substantial matter, and no man would have a right of reasonable complaint under this covenant if once in ten years he smelled a thing which he would rather not smell. In one of the old books a nuisance was described as a thing which would offend an ordinary man, and not a delicate-nosed person. It was impossible to go through life without more or less unpleasantness, living in a world where "give and take" must be the rule. Therefore the jury must not say that here there was a noisome effluvia merely because it was something they would rather not have near them, nor unless they were of opinion that the nuisance existed to such an extent as to give reasonable ground for objection. Had there been such a nuisance? The plaintiff's witnesses stated positively that the smells had frequently been perceived for many years past, and some of them left their houses in consequence. One of the witnesses said that the smell was not more than was ordinarily perceived from gas-works; but that was not the proper criterion, because the defendants were bound to prevent even that, if there were any means which could be reasonably adopted for that purpose. The defendants witnesses stated that they had experienced no inconvenience from the smells. The jury would judge between the two statements. In determining the question, they would have, as he stated, to consider whether there had been an escape of such noisome effluvia, and whether that escape was preventible by reasonable means. If they answered these questions in the affirmative, they would give the plaintiff damages on that head of claim. But it appeared to him manifest that those damages should be limited to the plaintiff's own inconvenience, because it was not suggested that any of the tenants who had left his houses had left on account of the smell, but on account of the water. All the damage which he attributed to the vicinity of the gas-works could not be referred to this particular head of claim, the greater part arose from the fouling of the water. He now came to the other and probably the more important question between the parties. The plaintiff said, "Though you had entered into no sort of covenant with me, I should be entitled to complain that you have committed a nuisance upon me, for which I have a right to bring an action against you—*i. e.*, I complain that you have committed a nuisance at common law and done me a wrong; you have made stenches and caused noisome effluvia in the neighbourhood of my habitation; you have destroyed my comfort and poisoned the water on my land, and you have done me not only a temporary but a permanent injury." If the plaintiff made that out he was entitled to recover damages at the hands of the jury. Did he make it out? He would not go over the evidence which tended to show that there had been an offensive nuisance in the shape of smells. The evidence upon that point, which was applicable to the claim for a breach of covenant, was also applicable to the question as to whether there was a common law nuisance independent of the covenant. Of course, the jury were not going first of all to give the plaintiff damages under the covenant, and then for the common law nuisance. The difference between the two cases would be seen, for this reason—on their covenant the defendants were only bound to prevent a nuisance if they reasonably could; on the other hand, though they could not prevent it, if there was a common law nuisance they were liable. So that there was a difference. The jury might think these were not preventible nuisances under the covenant, but still the plaintiff might recover for a common law nuisance, because a man had no right to establish a gas factory just wherever he pleased, and then say he could not help making a smell. His neighbour would be entitled to say, "If you are sorry for it, pay me compensation; if not, go." Then, again, the jury might find that the defendants had committed a nuisance, although peradventure they had not broken their covenant, or they might find that the covenant was broken, although there was no common law nuisance. They might say that although there was not enough to justify one neighbour complaining of another, there was a nuisance which might be avoided. So much with regard to the stenches and above-ground nuisances. He would now direct attention to what probably was the more important thing—viz., the fouling of the streams. That the streams were fouled, and fouled in such a way as to give a right of complaint, there could be no doubt. The question was, what was the cause of the pollution. The plaintiff contended that the defendants tanks leaked, and so caused the contamination. The defendants attributed the mischief to the dry well, in which no gas products ought to have gone, and they said that Fussell, who once occupied the works, not knowing what to do with his tar, put it into this well, and that though this tar had been removed from the well, it had poisoned the waters underneath, which was the cause of the evil. The jury would give their verdict according as they believed one or the other of these theories. There was a third possible case, which might be said to be part of the first—that, whatever Fussell might have done, a portion of the poisoning was due to the tanks. Then, inasmuch as part of the damage was referable to the defendants, the plaintiff would be entitled to recover. Very strong evidence was given of the leakage of the gasholder-tanks by the plaintiff's witnesses, and, if the jury believed it, the plaintiff had made out a good claim for damages. On the other hand, the defendants witnesses denied the statement, and asserted that the tanks were properly constructed; the jury would judge between them. If they were of opinion that the defendants had made out their case, there would not be the question of damages to consider; but, if they thought that the plaintiff had substantiated his claim, they would give him damages under either or both the heads of claim to which allusion had been made. If they found under one head for the plaintiff, and under the other for the defendants, they should specify the head found for the defendants, because they would be entitled to costs relating to the unfounded claim.

A Juror: I should like to know whether the defendants are liable to pay under the covenant with the plaintiff for any acts of Fussell.

Baron Bramwell: I think not, gentlemen; but you have raised rather a difficult question, and one which, perhaps, it is hardly worth discussing, because you know under the covenant he cannot recover for the fouling of the water; he can only recover for stenches. Well, now, I should not think you would give him damages for stenches seven years ago. Without saying hat in point of law you cannot do that, I think it would be safer for you, in your verdict, to say nothing about it. The plaintiff can only recover on account of his own personal inconvenience, and you will probably say as to what was done in Mr. Fussell's time, "It could not have been anything very substantial, or we should have heard of it before."

Mr. O'Malley said he would rather his lordship should rule that the plaintiff could not recover for anything done in Mr. Fussell's time than run the risk of raising any question hereafter on that point.

Baron Bramwell: The plaintiff does not ask damages in respect of what was done in Mr. Fussell's time. Consequently, you will only have to con-

sider the modern stenches since the defendants have been carrying on the works.

The jury then retired, and, after an absence of about half an hour, returned into court.

The FOREMAN stated that the jury found for the plaintiff on both counts—damages £300.

Miscellaneous News.

OTTOMAN GAS COMPANY, LIMITED.

The Ordinary Half-Yearly Meeting of the Shareholders of this Company was held at the City Terminus Hotel, Cannon Street, on Monday, March 23—S. A. BECK, Esq., in the chair.

Mr. A. J. KING (the secretary) having read the advertisement convening the meeting, the following report and statements of account were presented:—

The directors herewith present the audited statement of accounts for the half year ending Dec. 31, 1867.

The public lighting (with the exception of nineteen lamps) has been entirely suspended during the whole of the half year, and the business of the company has consequently been confined to the private lighting only, which has heretofore constituted one-half of the company's business. The rental on this account amounts to £1695, against £1597 of the corresponding period of 1866, and £653 in 1865.

The manager has been unable to realize the coke in stock on July 1st at the price at which it was then valued, and has had to write off the sum of £118 17s. 5d. from the profit and loss account of this half year on that account.

In regard to the account for the public lighting, the directors have to report that authority has been at length obtained from Constantinople for the formation of a municipality, which is now in process of formation; and it is hoped that, on its completion, settlement will be effected of the company's outstanding account, and satisfactory arrangements made in regard to the future lighting.

In the last report it was announced that the debentures authorized October 19, 1864, would shortly begin to mature, and a special resolution was passed August 30, to enable the board to issue preference shares or debentures to the extent of £15,000, in order to meet the bonds falling due. The board accordingly issued proposals for 3000 preference shares; but the number applied for being altogether inadequate to the occasion, the directors considered it inexpedient to issue any preference stock, and they have made it their object to obtain renewal of the bonds from the holders. In this they have generally succeeded, but there remains a balance of about £2000 to be provided, and applications will be received at the office for this amount in sums of £50 and upwards. The bonds will be for three years, and carry interest at 6 per cent.

The directors retiring by rotation are the Honourable Eliot Yorke and Edward Horner, Esq., who, being eligible, offer themselves for re-election. The auditors, E. P. Rowsell, Esq., and George Allin, Esq., also retire from office, but, being eligible, offer themselves for re-election.

Dr. *Balance-Sheet, December* 31, 1867. *Cr.*

To Capital	£50,000	0	0	By Plant	£40,323	18	2
Debentures	13,450	0	0	Concession and preliminary expenses	16,888	9	10
Sundry creditors	2,821	15	2	Stocks	4,455	6	10
Profit and loss	16	11	8	Amount owing for public lights	2,281	5	7
				Sundry debtors	1,730	16	9
				Cash	483	19	5
				Office furniture	124	10	3
	£66,288	6	10		£66,288	6	10

Dr. *Profit and Loss Account, December* 31, 1867. *Cr.*

To Cost of coals	£699	18	1	By Balance from last account		£173	12 8
Wages and expenses, Smyrna	666	10	7	Gas-rentals—			
	£1,366	8	8	General consumers	£1,695 13 9		
Loss on coke from estimated value of stock, June 30, 1867	118	17	5	Public lights	61 6 4		
Directors				Coke and tar	137 5 0		
Interest and discount	20	7	9		1,894	5	1
Interest on debentures	403	10	0	Net profit on chandeliers, fittings, meters, &c.	138	1	5
Exchange account	43	9	11	Transfer fees	1	2	6
Bad debts and allowances	10	18	11				
Depreciation of meters at rental	21	7	4				
Auditors	10	10	0				
Rent, salaries, printing, stationery, and office expenses, London	195	0	0				
Balance forward	16	11	8				
	£2,207	1	8			£2,207	1 8

The CHAIRMAN, in moving the adoption of the report, expressed his regret that the prosperity of the company did not increase so rapidly as they could wish. With respect to the preference shares, the issue of which was authorized by the last meeting, it was found that, upon sending notice to the shareholders, so small an amount could be raised, that the directors felt it would not be honest to take the money and allow the debentures to overrun them. They therefore applied to the debenture holders, and he was happy to state that they were met in the most kindly manner, so that, at the present time, they had been able to renew the whole, with the exception of about £1700; and they had no doubt, in the course of a few days, to get the consent of the holder of a £1000 bond to renew, so that there would be only £700 to provide. Referring to the position of the company generally, he remarked that the directors were in hope that the concern would prosper eventually. Authority had been obtained from Constantinople to form a new municipality in Smyrna, and when that was accomplished, he trusted that the means for paying off the public debt for light, now amounting to £2281, would be found. At present the company had no way of enforcing it. They had ceased supplying the public lights, with the exception of 19 lamps, and he feared they would be compelled to discontinue them till a better state of things was established.

The Hon. H. BROWNE seconded the motion.

Mr. KNIGHT said, notwithstanding the remarks of the chairman, he thought there was a bud of hope in the report, seeing that the rental for private lights had doubled itself in the last two years. And this bud of hope was expanded by the statement in the fourth paragraph which referred to the authorization of the new municipality, which led to the belief that the company would ultimately get payment of the money due to them, and be able to make satisfactory arrangements for the future. The statement in the profit and loss account, that out of a rental of £1693 the bad debts and allowances were only £10, was an encouraging feature, especially considering the circumstances in which the company had been placed at Smyrna. The least satisfactory statement in the report was contained in the third paragraph, which referred to the depreciation in the estimated value of the coke.

The CHAIRMAN, in explanation of the matter last referred to, said the manager estimated his stock of coke, in July, at the price he had been receiving, and which he had not since been able to realize.

The motion was put and carried unanimously, and the retiring directors and auditor were severally re-elected.

A vote of thanks to the chairman and directors closed the proceedings.

DOVER LOCAL BOARD.

THURSDAY, MARCH 19.

THE ACTION AGAINST THE GAS COMPANY.

The DEPUTY TOWN-CLERK reported the result of the prosecution by the board against the gas company—that the whole matter was referred to Dr. Odling to say whether, during the past year or any part of it, the manufacture of gas had been conducted in a manner calculated to avoid a nuisance; and if not, what proportion of costs should be paid by the defendants. He believed some misconception was abroad in reference to the matter, and he wished to make some explanation of the reason why arbitration was consented to. There was some peculiarity in the case that separated it from the ordinary rules of actions and indictments, inasmuch as if the prosecution gained the day they would still have to pay their own costs, and therefore their whole costs would have been thrown on the borough. That would in some degree account for the terms of the settlement, as the board would see that it was consented that Dr. Odling should say, in the event of his finding there had been a nuisance, what proportion of the costs of the prosecution should be paid by the defendants. The question was now referred to a scientific man.

Alderman REES said the explanation was very unsatisfactory to him, and only aggravated the difficulty into which the board had been plunged. He did not know by what authority the town-clerk had done what he had. Messrs. Anderson and Jones came there and made certain offers, and on that occasion the town-clerk was cautioned not to enter into a lawsuit if unnecessary, and this was said in terms sufficiently clear to let him know the mind of the board, so that they might not be plunged into law if arrangement could be otherwise accomplished. But the town-clerk had gone to Maidstone, and in the case no less than eight counsel had been employed, and, as he understood, about 80 witnesses had been taken there, and those to him not the right ones, inasmuch as the chairman of the company was not called. The whole thing was disastrous to the town, and might have been settled without expending a large amount of money in costs. It seemed to him that the town-clerk had gone far beyond the instructions of the board, and had got terms much less satisfactory than those which were offered them. He was also informed that the mayor was at the trial, and took part in the consultations with the counsel. If that were so, he wanted to know by whose power he was there. He (Mr. Rees), as an alderman of the borough, did not delegate to him any such power. The mayor had no power any more than another person to interfere in the town's lawsuits; he was the last man in the borough to whom such power should be delegated. It was notorious that his position conflicted with the interests of the town. His hand was against every man, and every man's hand against his.

The MAYOR called on Mr. Rees not to speak of him in such an insulting manner, but to ask him to explain his conduct.

Alderman REES: If the mayor had said he was not there he should not have said a word.

Mr. TERRY was ashamed of Alderman Rees.

Alderman REES asked the mayor what business he had at the Maidstone trial.

The MAYOR informed Mr. Rees that he had nothing to do with him. If an explanation were asked for he would give it.

Alderman REES said he would defer his remarks till after the explanation. If the mayor took part in the lawsuit, he did it without authority, and whatever he did the responsibility should rest upon him. No authority was given him by the office he held, and none by the board. The whole affair was as bungling a one as could take place in any town and in any lawsuit.

Mr. BIRMINGHAM believed the board endeavoured to make terms with the gas company; but as they did not succeed in that, the prosecution had to go on.

Mr. OTTAWAY thought the minutes relating to the lawsuit should be read.

Mr. MUMMERY proposed that the discussion of the matter should stand over till the decision of Dr. Odling was obtained.

Mr. CLARK seconded.

The MAYOR said that as his name had been mentioned in a most characteristic and improper manner by Alderman Rees, he wished to say he had had nothing to do with the lawsuit, and was not consulted in any way. He heard numerous witnesses were to be summoned to Maidstone, and having several friends among the counsel that attended the assizes, he, without any authority whatever, went there. He saw many persons there interested in the case, and he entered into the discussion that was going on. He did that without any authority but his own. He had nothing whatever to do in ruling or deciding in the case on the part of the borough, although he conversed with the counsel engaged in the suit. It was left entirely in the hands of the town-clerk; and if he had been instrumental in any way in saving the town expense, in saving the time of the court, or in obviating a trial which must have brought disgrace on the town, he was entitled to their thanks, and not to their censure. Alderman Rees's remarks were not worth anything, and when he said his (the mayor's) hands were against every man, he was simply insolent. It was just like him, for he was shaking hands one day with a man and was to-morrow fighting him. These incongruities were so notorious that not the slighest importance was attached to what he said.

Alderman REES took upon himself to deny that the mayor had any right to

interfere, and since he had admitted interfering, he should not forget where to fix the liability when they were called on to pay the bill.

The MAYOR denied that Alderman Rees objected in any way to the law proceedings, and said that he was a consenting party to whatever steps were taken. Alderman Rees, now that some costs had been incurred, came forward and endeavoured to fix the responsibility upon some one else.

Alderman REES said the reports of the newspapers would bear testimony that he did take exception to proceeding to law.

The MAYOR replied that very many other things were also stated in the newspapers.

Alderman REES was only getting rid of the charge that he was a consenting party to the lawsuit; and said that he stated a lawsuit was a very serious thing, and should not be entered into if it could be avoided. He only consented that the matter should be left in the hand of the town-clerk.

Mr. MUMMERY pressed his motion.

Mr. LEWIS remarked that if any censure were to be passed upon any individual it should not be left till the decision of Dr. Odling had been obtained, but should be passed irrespective of that. If the town-clerk were entitled to any censure as to the proceedings of the Maidstone trial, he should be told so; and if not, he should also be told so.

Mr. MUMMERY had something to ask in respect to the prosecution, but he thought it unwise to ask it then; and again suggested that the whole matter should be left over till the judgment of Dr. Odling had been obtained.

The DEPUTY TOWN-CLERK said that when the matter was placed in the hands of counsel to decide they were bound to abide by their decision. He did not know whether he had better say anything else then.

Several members thought not, and the matter was postponed.

CRYSTAL PALACE DISTRICT GAS COMPANY.

The Ordinary Half-Yearly General Meeting of this Company was held at the City Terminus Hotel, Cannon Street, on Thursday, March 26—ERASMUS WILSON, Esq., F.R.S., in the chair.

Mr. MAGNUS OHREN (the secretary) read the advertisement convening the meeting, and the chairman affixed the seal of the company to the register of proprietors.

The following report and statement of accounts were then presented:—

The directors have to report the satisfactory progress of the company's business during the half year.

The works and plant are in a state of efficiency, and some further improvements that will contribute to the convenience of the manufacture have been commenced. The reports of Dr. Letheby, and of the chemical inspectors of the various parishes supplied by the company, have been satisfactory as to purity and illuminating power.

The directors going out of office by rotation are Dr. Frederic Hetley and Mr. Robert John Clarke; and, being eligible, these gentlemen offer themselves to the shareholders for re-election.

The auditor going out of office is Mr. William Purvis; and Mr. Purvis being eligible, offers himself to the shareholders for re-election.

The balance-sheet for the half year to the 31st of December last, and appended to this report, shows the financial position of the company. The profits for the half year are £6243 10s. 7d., which together with £69 4s. 1d., the unappropriated profit of the preceding half year, make the available balance £6312 14s. 8d. Out of this sum the directors recommend the declaration of a dividend at the rate of 6 per cent. per annum on the preference capital; a dividend at the rate of 7 per cent. per annum on the ordinary 7 per cent. capital; and a dividend at the rate of 10 per cent. per annum on the original capital; all free from income-tax; the sum of £100 to be written off preliminary expenses, and £574 7s. 3d. off parliamentary expenses; the balance of £280 13s. 9d. to be carried forward to the profit of the succeeding half year.

Dr. *Profit and Loss, Half Year ending December 31, 1867.* *Cr.*

To Amount for coals carbonized			£9,468	19	4		
Lime and oxide			153	18	1		
Trade charges			1,106	3	0		
Mains renewal account, written off			245	16	11		
Works renewal account, written off			140	10	0		
Rents, rates, and taxes			899	8	0		
Directors and auditors fees			530	0	0		
Salaries and collectors commission			955	6	1		
Wages			2,513	7	3		
Interest on loans			822	8	3		
Bad debts and allowances on collection			208	15	6		
Law charges, written off			173	9	7		
Retort account, written off			400	0	0		
			£17,618	2	0		
Profit			6,243	10	7		
			£23,861	12	7	£23,861	12	7
By Private rental, Michaelmas quarter						£5,157	7	6
Public ditto, ditto						1,130	3	8
Private rental, Christmas quarter						11,330	0	2
Public ditto, ditto						1,271	11	10
						18,889	3	2
Meter-rental						284	14	11
Coke made for sale						£4,002	10	7
Breeze ditto						153	2	4
Tar ditto						302	19	10
Sundries						134	10	4
						4,593	3	1
Sulphate of ammonia—net profit						94	11	5

Dr. *Balance-Sheet, December 31, 1867.* *Cr.*

To Proprietors for paid-up capital—						By Amount for plant, &c.	£146,481	9	1
5000 preference shares, at £10 per share			£50,000	0	0	Works renewal account (suspense account)	£1,263	12	0
5000 original shares, at £10 per share			50,000	0	0	Mains renewal account (suspense account)	2,213	2	4
10,000 ordinary 7 per cent. shares, at £10 per share	£100,000	0	0			Law charges account (suspense account)	150	0	0
Less amount uncalled	61,209	0	0				3,626	14	4
			38,791	0	0	Freehold land	8,883	5	8
Loans on debenture			24,460	0	0	Preliminary expenses	3,250	0	0
Amount due to sundry persons			15,194	6	1	Parliamentary ditto	574	7	3
Contingent-fund—						Retort account	1,186	7	5
Uninvested	£1,013	16	2			Stock on hand	6,309	7	5
Invested	164	5	5			Amount due from sundry persons	1,179	14	3
			1,178	1	7	Invested in Consols from contingent-fund	164	5	5
Profit unappropriated			69	4	1	Private gas and meter rental, Christmas quarter	11,475	12	7
Profit and loss			6,243	10	7	Arrears	320	19	8
						Public rental (Christmas quarter), fittings, and arrears	1,655	8	10
						Balance at bankers	828	10	5
			£185,936	2	4		£185,836	2	4

Appropriation of Balance.

Balance brought forward from last account			£ 69	4	1	Dividend on preference share capital, at 6 per cent.	£1,500	0	0
Ditto of profit and loss, Dec. 31, 1867			6,243	10	7	Ditto on original share capital, at 10 per cent.	2,500	0	0
						Ditto on ordinary 7 per cent. capital, at 7 per cent.	1,357	13	8
							£5,357	13	8
						Parliamentary expenses, to be written off	£574	7	3
						Preliminary ditto, ditto	100	0	0
							674	7	3
						Balance to be carried to next account	280	13	9
			£6,312	14	8		£6,312	14	8

The CHAIRMAN moved—"That the report of the directors and the balance-sheet confirmed by the auditors be received, adopted, and entered on the minutes." In doing so, he said it would be only necessary that he should trespass for a short time upon the attention of the meeting while he offered a few explanations respecting the present position of the company. It must necessarily be a matter of satisfaction to the shareholders to feel that their affairs were going on steadily and well, and to have the continued assurance of the directors that everything was proceeding in the way they could most desire. The company had always been progressive in its character. Year by year additions had necessarily been required to the plant and works, so as to adapt them to the increasing demands of the growing district supplied by the company. Last year was exceedingly active in these changes, so much so that the work done almost amounted to a renewal of the entire machinery. During that period a siding had been constructed from the Mid-Kent Railway into the company's yard, and a weighing-machine and turn-table had been erected for the purpose of facilitating the delivery of coals and fire-clay goods upon the premises. A new condenser of the battery kind, of a large size, and with the means of using the whole or part, as circumstances required, had been put up; the size of the scrubbers had been increased; a new set of pumps for ammoniacal liquor and water, a new steam-boiler, two steam-engines, and two purifiers had been erected; the connexions of one of the old governors had been enlarged, and a new governor had been added to those previously possessed. The directors had also put into repair one of their earlier gasholders, so that it was now in a condition equal to new. Nor had they been idle in their district outside the works, as the shareholders would acknowledge when he stated that, during the year, the length of their mains had been augmented to upwards of 6½ miles, with all the necessary appurtenances to render the service thoroughly effective. There was one portion of the report which no doubt would be considered the sweetest of the whole, because it contained the kernel of the nut—viz., that which referred to the profits realized during the last half year. Those profits, honestly and fairly earned, enabled the directors to recommend the maximum dividend to which the shareholders were entitled. The wisdom of the Legislature had so regulated this matter that while the shareholders were protected on the one side the public were protected on the other; and if by their diligence and skill the directors were enabled to give their constituents the dividend to which they were fairly entitled, any excess of profits must be disposed of in favour of the consumers. The institution was therefore a self-supporting one, for while the workers were well paid, the customers got a fair return for the payments they made. At the last half-yearly meeting a discussion arose on the figures of the balance-sheet, and some remarks were made by one of the company's earliest and best friends, Mr. Livesey, which, as coming from so thoroughly practical a man, and one who had so successfully managed his own company, demanded the best consideration of the directors. He hoped that, looking over the accounts now presented, Mr. Livesey would be able to say that he was better satisfied with the form they now assumed.

Mr. J. CURTIS seconded the motion.

Mr. LIVESEY regretted that he was obliged to say he was still dissatisfied, for there was still that blot on the balance-sheet—the suspense account—and he thought the proprietors should seriously consider the matter, and induce the directors to take steps to reduce it. It was nothing but a system like that which had caused the ruin of so many railways. The Brighton and Great Eastern Railways, for example, had been forestalling profits for years, a course of proceeding which had led to their present position. This company was doing the same thing, and he deeply deplored the fact that the accounts on this occasion, being so much more favourable than last half year, enabling the directors to give the proprietors a fair 10 per cent., they did not, under the circumstances, allow matters to stand upon their own footing, instead of trying to make them appear better by adding to the suspense account. This account began in 1866, when £600 was carried to its credit; the next half year £1400 was added, and the next half year £930. This suspense account, he thought, the directors must have felt ashamed of, because, instead of putting it down as it really was, they included it in

the sum of £4200 as due from various debtors. The proprietors would have known nothing whatever about it if he (Mr. Livesey) had not, at the last meeting, inquired how it was so large a sum was put down under that head. It then came out that £2930 was due to suspense account. The directors took credit on this occasion for something like £385, as written off the renewal of works and mains in the profit and loss account, and yet in the balance-sheet they managed to increase the suspense account, instead of reducing it by that sum, from £2930 to £3626. He should be sorry to ask the proprietors to express an opinion by vote upon this matter, because he was perfectly satisfied the directors were doing the best they could for the company, but in his judgment this was the worst course they could pursue. The last number of the JOURNAL OF GAS LIGHTING contained an article by the editor which referred to this very subject, and he would take the liberty of laying a quotation before the meeting, because the editor of that JOURNAL was a man well known in the gas interest, who thoroughly understood the business, and whose opinion on such matters was frequently sought. Speaking of the management of the Manchester Corporation Gas-Works, which was the *pons asinorum* of amateur gas engineers, the writer of the article remarked:—"The model corporation gas supply of Manchester is presenting a new phase to its admirers, which exhibits great ingenuity in the endeavour to conceal the recent deficiency in the revenue of the undertaking. The Gas Committee had the problem before them, how to secure an amount of profit equal to 10 per cent. on the amount of capital employed in the manufacture of gas, at a time when the increased cost of manufacture has reduced the profit to little more than 5 per cent. The usual course adopted would be to raise the price of gas, as was done under similar circumstances by the Liverpool United Gas Company; but such a common matter-of-fact way of getting out of the difficulty would not suit the clever managers of the Manchester Corporation Gas-Works, and it would have somewhat tarnished the lustre of their renowned success. They accordingly concocted the device of making up the deficiency by what they term a 'suspension account,' to which the overpaid balances are to be carried, in the hope that the amount may be recouped by extra profits to be gained in years to come. This proposition is, in plain words, an attempt to pay for town improvements out of gas profits *in prospect*. It is no doubt a novel and ingenious plan for hiding a falling off in revenue, but though it may excite admiration when practised by a corporate body, it would scarcely be tolerated in the management of a gas company. It amounts, in point of fact, to the borrowing of money for the payment of dividends to keep up a false appearance, and any gas directors who were guilty of such deception would be severely and deservedly denounced." Now, it was a fact that, if the directors of this company had deducted these amounts from the profits for the half year to Midsummer, 1866, instead of paying 10 per cent. upon the original capital, they could only have paid 8¼ per cent.; for the half year ending Christmas, 1866, they could only have paid 5½ per cent.; and for the half year ending Midsummer, 1867, only 4¾ per cent. The present accounts (for which he gave the directors the utmost credit, as being the best they had presented for many years) showed a profit of 11¼ per cent., even if they did not carry one penny to suspense account. Then, again, he would ask why, at the end of the accounts, they did that which the law did not allow them to do—appropriate the greater part of the balance to writing off parliamentary and preliminary expenses. Now, according to the Gas-Works Clauses Act, that was illegal, and the profit above 10 per cent. ought to be set aside for a reserve-fund to make up the 10 per cent. for a certain number of years, and, when that was done, it must be appropriated to the benefit of the public. They had no power to write off one penny to the credit of capital, or, if they had, he should think it would be much more satisfactory to carry the £674 to the credit of the suspense account. He hoped the directors would really seriously consider the matter. He was perfectly sure they were desirous to do everything for the benefit of the company, and it was extremely painful to him to have to make these comments upon the statements laid before the meeting.

Mr. H. P. STEPHENSON said he was much obliged to Mr. Livesey for the remarks he had made, and was glad he had let the directors off so easily on the present occasion. At the last meeting Mr. Livesey did point out very fairly indeed to the shareholders some things in connexion with the working of the concern which it was quite admitted were open to observation. He was glad to hear Mr. Livesey say that, looking at the present balance-sheet, those things had been considerably improved. He should have been prepared to show, if necessary, that the directors had availed themselves of the suggestions made by Mr. Livesey, and for which they felt themselves indebted to him. He (Mr. Stephenson) desired, in a few words, to point out the very peculiar position of this company, arising out of the rapid progress of the district they supplied—a district which not long since was a district of green fields, but had now been converted into a town district, and was still increasing in extent and population. During the last four years the company had reduced the price of gas about 9d. per 1000 feet—a very large reduction for a company in this position. But notwithstanding that, they had had the very large increase over the four years of 73 per cent. in money. Their tonnage of coals carbonized had been increased 93 per cent., and the money value of those coals 114 per cent., so that it would be seen the progress had been exceedingly rapid for a moderately small gas company. But notwithstanding the 93 per cent. increase in the tonnage of coals carbonized, the capital of the company had increased to the extent of only 65 per cent. Therefore, although they had spent a great deal of money, yet they had not spent it in a greater proportion than the rental had increased; on the contrary, it had increased in a considerably less ratio than the increase of the business. Taking the period from June, 1866, to December, 1867, the proportion of capital spent, as compared with the rental, taking it half year by half year, was as follows:—For the first half year, £9 19s. 5d.; for the second half year, £9 9s.; for the third half year, £9 16s. 6d.; and for the last half year, £8 12s. 10d. At the present moment the capital account, as compared with the half year's rental, stood at a lower amount than it had stood since the commencement of the company. Therefore, although they had spent a great deal of money—a fact which he regretted very much, and concerning which he might say the most anxious attention of the directors was always engaged to prevent everything like unnecessary outlay—yet they had not expended capital in anything like the same ratio that the business had increased. There were some expenditures of capital which it was absolutely impossible to avoid, and which it would be seriously detrimental to the interests of the company if they did not meet. They had possession given to them by Parliament of a certain defined district, and they had a duty to perform to the public in that district. They could not allow a small opposition company to start in any portion of that district because they were too sparing of their capital to extend their mains there for the convenience of the consumers. On the last occasion, Mr. Livesey very properly pointed out that it was an improper thing for the directors to include, under sundry debtors, the suspense account which was then existing. He (Mr. Stephenson) hoped it was not necessary for him to assure the proprietors that the directors had no desire whatever to conceal anything from them; but upon Mr. Livesey putting his finger upon the blot, they did consider the subject, and they agreed with him that it was better for the suspense account to be separately set out on the face of the accounts, which they had done on the present occasion. But then he must say that he did not think Mr. Livesey exactly understood the nature of this suspense account; and perhaps it might be well, in a few words, to explain what it was. The proprietors would quite comprehend that as regarded a capital payment, that was a payment made once for all, and was supposed never to occur again. But a revenue payment was a payment occurring continually, half year by half year, and naturally was carried to the working revenue account. But this company was placed in peculiar circumstances, they were continually building up, and then, finding that their works were too small, pulling down and rebuilding, so that there was a vast amount of expense, particularly in the last two or three years, constantly being incurred which was not in the nature of capital expenditure, and therefore could not justifiably be carried to capital account, it being employed in re-erecting portions of existing works. Nor could the outlay be regarded as really in the nature of repairs, for it was not because the apparatus or building was worn out that it had to be taken down and put up again, but it was in the nature of an extraordinary expenditure, which the directors hoped might never occur again; and although, by a little stretch of the imagination, they might have felt themselves exonerated in carrying it to capital account, they thought—and they took credit to themselves for so doing—that it would be better to place it to a suspense account, it being clearly understood that that suspense account was to be written off over a number of years. And he might be allowed to remind the meeting that this was a principle which was recognized by the Legislature itself, for in the Companies Act, 1862, there was a clause which he thought might be taken to represent the views of the Legislature with regard to the mode in which companies should keep their accounts. After providing that a statement of accounts shall be prepared, the clause proceeded—"The statement so made shall show, arranged under the most convenient heads, the amount of gross income, distinguishing the sources from which it has been derived, and the amount of gross expenditure, distinguishing the expense of the establishment, salaries, and other like matters. Every item of expenditure fairly chargeable against the year's income shall be brought into account, so that a just balance of profit and loss shall be laid before the meeting. And in cases where any item of expenditure, which may be in fairness distributed over several years, has been incurred in any one year, the amount of such item shall be stated, with the addition of the reasons why only a portion of such expenditure is charged against the income of the year." Now, as to the things which the directors had in this case placed to suspense account, he might state that they had been altering the position of the purifiers, and pulling down certain works and re-erecting others; they had also been taking up mains in the district and laying down larger ones. These were the matters which they placed to the suspense account, and he for one certainly thought they were fairly chargeable as such. Of course the directors would be glad to get rid of the necessity for such a course, and they believed that ultimately they should do so. But, at present, he thought it would be suicidal to the interests of the company to sweep away all these matters, by charging them against the revenue account in any one half year; thereby depreciating the value of their property by absorbing a large portion of the dividend for the time being, and putting them in the position of having too large an amount of profits for dividend in a subsequent half year. The suspense account now amounted to £3626, and they would write off some portion half year by half year. They had taken off some this half year, although, upon the whole, the account was increased, because, on the principle he had laid down, the expenditure under these heads had continued during the last six months. He believed, however, that there would not be any more of these alterations, probably, for some years to come, and therefore this account would not further increase. But the question of a suspense account was by no means a new thing with this company. Their preliminary expenses account was a suspense account, and they had been nibbling at it and reducing it from time to time, as they had the opportunity of doing it, and it was an account which they hoped ultimately to wipe out entirely from the balance-sheet. The retort account also had been a suspense account. That was an account to which was added the price of all new retorts purchased, and every half year the directors wrote off from it such an amount as represented the fair value chargeable for that period under this head. Their parliamentary expenses account had been a suspense account. If, in any one year, they had been obliged to spend £1000, they did not write off the whole amount from the profits of that year. They placed the whole to a suspense account, and wrote off portions from time to time, as they were able to do so. This half year they had wiped off the whole, and hoped to have no more of it. The other point raised by Mr. Livesey was the question of writing off, as the directors had done, £574 for parliamentary, and £100 for preliminary expenses this half year; but he scarcely thought Mr. Livesey was in earnest in suggesting that the directors were not justified in writing these sums off the profits. Surely they would not have been justified in adding them to capital. Seeing they had written off £674 this half year, they would have that amount extra next half year to write off the suspense account. The directors reciprocated the desire expressed by Mr. Livesey to reduce this account as soon as possible, but they believed they were right in the principle they had adopted of putting them on the balance-sheet.

Mr. LIVESEY said he read the clause exactly as Mr. Stephenson had done, and he agreed with him that if the expenses of the kind referred to in one half year were too heavy, the directors were justified in dividing them over two or three half years. But here they were not doing that; they were gradually increasing instead of reducing the suspense account.

Mr. STEPHENSON said that arose solely from the alterations which had been necessitated on the works.

Mr. BROWN inquired how long it was since any amount had been written off preliminary expenses until this half year.

Mr. STEPHENSON said they had done so on several occasions.

Mr. HADLAND said £50 was written off in December, 1866.

After some further conversation, the motion for the adoption of the report was put, and carried.

On the motion of Mr. C. AIRD, seconded by Mr. D. W. OGG, it was resolved—"That a dividend at the rate of 6 per cent. per annum on the preference capital, a dividend at the rate of 7 per cent. per annum on the ordinary 7 per cent. capital, and a dividend at the rate of 10 per cent. per annum on the original capital, all free of income-tax, be now declared, and be made payable forthwith."

The retiring directors and auditor were severally re-elected, and a vote of thanks was given to the directors for their able management of the affairs of the company during the past half year.

Mr. STEPHENSON acknowledged the vote, and in doing so expressed his belief that the present prosperity of the company would continue, and that if left in undisturbed possession of their district they could supply gas as

they had hitherto done, upon as low and satisfactory terms as any other company.

Mr. HADLAND moved—"That the thanks of this meeting be given to the auditors and officers of the company for the efficient discharge of their duties." He said the company had an excellent board of directors, but a great deal of their prosperity depended upon the efficiency of their officers. The accounts were in charge of two able auditors, one of whom was specially versed in gas matters. All the proprietors were thoroughly satisfied of the efficiency of their excellent secretary, and judging from the result of the last half year's working, he thought they might congratulate themselves on having an excellent engineer.

Mr. ALFRED WILLIAMS seconded the motion, which was carried unanimously, and acknowledged by Mr. GRAY, one of the auditors.

On the motion of the Rev. G. POCOCK, seconded by Mr. LIVESEY, a cordial vote of thanks was given to the chairman, and this having been acknowledged by Mr. WILSON, the proceedings terminated.

SHEPPY GAS CONSUMERS COMPANY.—The directors of this company have issued their report for the last half year, which states: "A considerable number of new consumers have been already secured by the system of letting gas-fittings on hire in private houses. The directors believe that the introduction of this system by the company will ultimately induce an almost universal use of gas in Sheerness among all classes. The profits of the business of the past half year enable the directors to recommend the declaration of the following dividends: A dividend after the rate of 2*s.* per share for the half year upon the 4 per cent. preference shares; a dividend after the rate of 10 per cent. per annum, or 5*s.* per share, for the half year upon the ordinary shares; and a dividend at the same rate per annum on the 'A' shares. The declaration of these dividends will leave a balance of unappropriated profits, which the directors suggest should be carried to the reserved fund account." The receipts for 1867 were £6405, and the profits £1857.

THE NUISANCE AT THE NEW MALDEN GAS-WORKS.—At the meeting of the West Surrey County Bench, at Kingston, on Thursday, March 19, the summons against Mr. Viney, proprietor of the New Malden Gas-Works, came on again for hearing. The case was adjourned from the February sitting to afford the defendant an opportunity to abate the nuisance. It was now stated by Mr. Bussell, who attended for the local board, that instead of being remedied the nuisance was worse than before. Mr. Keily, who attended for the defendant, assured the bench that all refuse lime had been removed from the premises, and everything that could be done had been done to avoid cause of complaint. Mr. George Anderson, gas engineer, was called for the defence, and deposed that the works were carried on in a proper manner, and that there was no nuisance on the premises. He produced several flowers which had been plucked from a spot contiguous to the works, as evidence that no deleterious gases could be escaping into the atmosphere in which they were grown, also a bottle of water perfectly fresh which had been taken from a ditch close by. As a counter demonstration, Mr. Edmonds, surveyor to the local board, had come provided with a bottle of stinking gas water. The court ruled that the question of nuisance could not now be reopened; the only point was whether anything had been done to remedy the evil which was proved on the last occasion. Mr. Bliss, the manager of the works, having been heard, the defendant was convicted in a penalty of 40*s.* and costs, amounting to £6 12*s.* Mr. Keily gave verbal notice of appeal from the decision of the bench to the quarter sessions.

PROPOSED WATER SUPPLY AT FLORENCE.—The correspondent of the *Times* says: "We learn that the detailed plan for bringing water to Florence from the river Sieve, a distance of nearly 20 miles, has been submitted to the acting syndic of Florence by the Glasgow house of Laidlaw, and that Marquis Garzoni has manifested the best intention of getting it speedily examined and finally reported upon. It does little honour to Florentine public spirit that so little has been done in three years to render this interesting city more worthy of its high position as capital of Italy, and that its increased and increasing population are still compelled to drink foul water, which boiling and filtration may improve, but can never effectually purify. It is well known to medical men here that to bad water and drainage is to be attributed a very large proportion of the maladies that occur in Florence."

Share List of Metropolitan Gas Companies.

No. of Shares issued.	Amount per Share.	Name of Company.	Amount paid up per Share.	Div. per Cent. per Annum	Price per Share.
	£		£ s d	£ s d	£ s d
8000	10	Anglo-Romano . .	10 0 0	9 0 0	11 to 12
5000	20	Bahia (Limited) . .	20 0 0	nil.	14 0 0
1000	20	Do., preference .	20 0 0	10 0 0	20 0 0
750	20	Do., do., redeemable	10 0 0	10 0 0	12 10 0
40000	5	Bombay (Limited) .	5 0 0	5 0 0	4 to 4½
10000	5	Do., third issue .	3 0 0	5 0 0	2 to 2½
10000	20	British, Limited . (Norwich, Hull-Sculcoates, Hanley, Tunstall & Shelton [Potteries], Trowbridge, & Holywell.)	20 0 0	6 0 0	28 to 29
12000	50	*Chartered*	50 0 0	6 10 0	44 to 45
6000	50	Do.	40 0 0	6 10 0	34 to 35
10000	20	*City of London*, A shares	20 0 0	9 0 0	21½ to 22
10000	10	Do., B shares	10 0 0	4 0 0	6 to 6½
9629	10	Do., new shares	10 0 0	9 0 0	11 to 11½
25000	25	City of Moscow (Limited) . . .	25 0 0		7½ to 8½
17490	25	*Commercial* . . .	25 0 0	10 0 0	32 to 33
20000	20	Continental Union.	20 0 0	4 0 0	14 to 15
10000	20	Do., preference .	20 0 0	7 0 0	20 to 20½
5000	10	*Crystal Palace District* . . .	10 0 0	10 0 0	13½ to 14
5000	10	Do., preference .	10 0 0	6 0 0	12½ to 13
10000	10	Do., new shares .	2 10 0	7 0 0	2½ to 3
4000	50	*Equitable*	50 0 0	10 0 0	63 to 65
4000	25	Do., new shares.	25 0 0	10 0 0	32 to 33

No. of Shares issued.	Amount per Share.	Name of Company.	Amount paid up per Share.	Div. per Cent. per Annum.	Price per Share.
	£		£ s d	£ s d	£ s d
23406	10	European (Lim.) .	10 0 0	10 0 0	13 to 13½
12000	10	Do., new shares.	5 0 0	10 0 0	6½ to 7
		Boulogne, Amiens, Rouen, Caen, Havre, & Nantes.)			
20000	10	*Great Central Gas Consumers* . . .	10 0 0	10 0 0	13 to 13½
5000	10	Hong Kong (Lim.)	10 0 0	5 0 0	8 to 10
26000	50	*Imperial*	50 0 0	10 0 0	62 to 63
1300	100	Do., bonds . . .	£100	10 0 0	170 to 175
28000	50	*Impl. Continental* (Amsterdam, Berlin, Ghent, Hanover, Lille, Rotterdam, Aix-la-Chapelle, Antwp., Bordeaux, Brussels, Cologne, Frankfort-on-M., Haarlem, Stolberg, Toulouse, & Vienna	43 15 0	16 0 0	96 to 97
400	100	Impl. Mexican (L.)	100 0 0	nil.	
200	100	Do., new	100 0 0	nil.	
3000	40	*Independent* . . .	40 0 0	10 0 0	50 to 53
3000	10	Do.	10 0 0	5 0 0	7 to 9
7133	50	*London*	50 0 0	10 0 0	63 to 64
5610	25	Do., 1st pref. .	25 0 0	6 0 0	25 to 27
503	50	Do., 2nd pref. .	50 0 0	6 0 0	
214	50	Do., 3rd pref. .	50 0 0	6 0 0	
18781	0	Do., 1st pref. sk		6 0 0	
11828	*l*	Do., 2nd pref. sk		5 0 0	
12000	5	Malta & Medit. (L.)	5 0 0	4 0 0	3½ to 4
6000	5	Do., preference .	5 0 0	7 0 0	5 0 0

No. of Shares issued.	Amount per Share.	Name of Company.	Amount paid up per Share.	Div. per Cent. per Annum.	Price per Share.
	£		£ s d	£ s d	£ s d
30000	5	Oriental, Calcutta	5 0 0	9 0 0	6½ to 7
30000	5	Do., new shares.	1 0 0	9 0 0	1¼ to 1⅜
10000	5	Ottoman (Limited)	5 0 0	nil.	1⅜ to 2½
10000	10	Pará (Limited) . .	10 0 0	6 0 0	8½ to 9
27000	20	*Phœnix*	20 0 0	10 0 0	25 to 26
3600	100	Do., new	35 0 0	7 10 0	35 to 36
144000	8k.	Do.	100 0 0	5 0 0	71 to 73
5000	20	*Rateliff*	20 0 0	10 0 0	22 to 24
	20	Rio de Janeiro (L.)	20 0 0	10 0 0	22 to 23
6959	5	Singapore (Lim.) .	5 0 0	3 0 0	
2000	5	Do., preference . Shanghai	5 0 0	7 10 0	
4800	50	*Sth. Metropolitan*	50 0 0	10 0 0	70 to 71
15000	10	*Surrey Consumers*	10 0 0	9 0 0	12¼ to 12⅞
10000	10	Do., new	6 0 0	9 0 0	7¼ to 8
9000	4	United General . . (Limerick)	4 0 0		2 to 2½
10000	10	*Victoria Docks* . .	5 0 0	6 0 0	
1500	10	*Wandsworth and Putney*	10 0 0	10 0 0	10 0 0
2989	10	Do.	10 0 0	7 10 0	
316	10	Do.	6 10 0	7 10 0	
1128	10	Do.	3 0 0	7 10 0	
20000	10	Western (Limited) A shares.	10 0 0	10 0 0	14 to 14¼
10000	10	Do., B shares.	6 0 0	10 0 0	7½ to 8½
10000	10	Do., C shares.	6 0 0	10 0 0	7¼ to 8¼
20000	10	Do., D shares.	1 0 0	10 0 0	1¼ to 2
8000	5	*West Ham*	5 0 0	7 10 0	6 10 0
6000	5	Do., new shares.	3 0 0	7 10 0	3 18 0
551	10	W. Lon. Junc. (L.)	10 0 0	6 0 0	
520	10	Do., preference .	10 0 0	6 0 0	

Price Current.

CASTINGS.—*Per Ton.*

Average Weight of Cast-iron Gas-pipes, per Yard.

1¼ in.	2 in.	2½ in.	3 in	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lb

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow.	Newcastle	Wales.	Yorkshire, Derbyshire, and Staffordshire.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Pig Iron, No. 1 (g.m.b.)	3 12 6	2 12 9	2 7 6	3 5 0	3 5 0
1¼ and 2-inch Socket-pipes	7 10 0	6 0 0	6 15 0	6 15 0	7 10 0
2½ and 3-inch ditto	7 0 0	6 0 0	6 5 0	6 10 0	7 0 0
4 and 5-inch ditto	6 10 0	5 10 0	5 15 0	6 0 0	6 10 0
6 inches and upwards ditto	6 5 0	5 0 0	5 10 0	5 15 0	6 5 0
Retorts, 1st fusion, hot blast	6 0 0	—	5 5 0	5 10 0	6 0 0
Ditto, 2nd ditto, cold ditto	7 0 0	5 15 0	5 15 0	6 0 0	7 0 0
Tank-plates, ¾ thick and above	6 10 0	5 10 0	5 10 0	5 15 0	6 5 0

WROUGHT-IRON TUBING,

Subject to 50 per cent. Discount.

	2 in.	1½ in.	1¼ in.	1 in.	¾ in.	½ in.
	s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*
Patent Welded Tubes, from 2 to 12 feet—per foot	1 8	1 0	0 10	0 7	0 5	0 4½
Ditto ditto, from 6 inches to 18 inches—each	3 0	2 0	1 9	1 3	1 0	0 9
Connecting-pieces, or Long Screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, Springs, and Elbows (wrought iron)	3 9	2 3	1 9	1 0	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, ditto	4 6	3 0	2 6	2 0	1 6	1 2
Iron Cocks	17 6	9 6	7 6	4 6	3 3	2 6
Ditto, with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing Sockets, Caps, Plugs, and Nipples	1 3	0 9	0 8	0 6	0 5	0 4
Plain Sockets	1 0	0 8	0 7	0 5	0 4	0 3
Syphons, 2-quart	15 0	14 0	13 6	13 0	12 0	—

GAS COALS.—*Per Ton.*

Newcastle.—Unscreened:—

Haswells, Nettlesworth Primrose, and South Pelaw	7*s.* 6*d.*
Felling, Framwell Gate, North Pelton, Redheugh Main, Walker's Primrose, West Wear, and Whitwell Primrose	7 9
Burnhope, Craghead, Charlaw, Derwent, East Castle, Edmondsley, Eighton Moor, Hartlepool Pelaw, Holmside, Lambton's Gas, Lanchester Pelaw, Medomsley, Mickley, New Pelaw, Pelaw Main, Ravensworth, Seaham, South Moor Pelton, South Leverson, Townley Main, Tyne Main, West Pelaw, Wearmouth Hutton, and Witton.	8 0
Peareth, Ravensworth Pelaw, Waldridge, West Garesfield, and West Pelton	8 3
Brancepeth, Dean's Primrose, Londonderry Gas, New Pelton, Pelton, South Peareth, Stella, Urpeth, Washington Hutton, and West Leverson	8 6
Ramsay's Newcastle Cannel	15 0
Wigan Cannel (at Liverpool)	17 9

Scotch Cannel:—

Boghead (at Leith)	42 6
Muirkirk	27 0
Kirkness, best (at Burntisland)	28 6
Capeldrae, 1st quality (at ditto)	28 6
Ditto, 2nd ditto (at ditto)	18 6
Cowdenbeath	12 0
Lesmahago (at Glasgow)	31 6
Ditto (at Granton)	31 6
Arniston	27 6
Wemyss	27 6
Haywood, Wiltontown (at Granton)	23 0
Pirnie, or Methill	17 0
Lothian's Cannel (at Leith)	28 0
Myles' Cannel	23 6
Lochore Parrot (at Burntisland)	28 0
Lanemark (at Glasgow)	16 0

FREIGHTS.

Coastwise—Newcastle.—Per Ton:—

Chatham and Rochester	4 9
Cork	8*s.* 6*d.* to 9 0
Dover, Folkestne, & Ramsgate	6 0
Dublin	9*s.* to 9 6
Exeter Quay	8 0
Ipswich	4 6
London (from Leith)	8*s.* to 8 6
London (Pool)	5*s.* 1½*d.* to 5 3
Lowestoft and Yarmouth	4 6
Portsmouth & Southampton	7 0
Plymouth	7 6
Shoreham	6 6
Whitstable	5 0
Weymouth	7 6

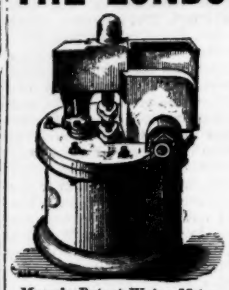
Foreign.—Per Keel:—

Barcelona	£17 10
Bordeaux	13 0
Boulogne and Calais	7 10
Cadiz	13 10
Cronstadt	—
Copenhagen	£7 15*s.* to 8 0
Genoa	£17 to 17 10
Hamburg	8 0
Havre de Grace	7 15
Leghorn	17 10
Lisbon	11 10
Rotterdam	9 0
Stettin	10 0
Trieste	16 0
Venice	18 10

SUNDRIES.

Best Nstle. Fire-bks., p. 1000, £2 16*s.* to £2	18 0
Cliff's Fire-bks. (at Wortley), p. 1000	2 15 0
Ingham's ditto (at Wortley), p. 1000	2 15 6
Fire-clay Retorts, p. ft. run, 5*s.* 6*d.* to	0 7 0
Tough Cake Copper, p. ton	78 0 0
English Pig Lead, p. ton	19 10 0
Welsh Bar Iron (in London), p. ton	6 2 0
Foreign Spelter, p. ton	20 10 0
English Block Tin, p. ton	98 0 0
Banca, p. ton	93 0 0
Tarred Rope Yarn, p. cwt.	1 0 0

THE LONDON & WESTMINSTER METER COMPANY, LIMITED.



Myers's Patent Water-Meter.

PATENTEES AND SOLE MANUFACTURERS OF

THE ABC GAS-METER.

EDGE'S PATENT INDEX.

MYERS'S PATENT WATER-METER.

(A CYLINDER and PISTON.)

A B C Gas-Meter.

The ABC GAS-METER shows in plain figures the money payable for Gas consumed, at well as the number of cubic feet.

MYERS'S WATER-METER is accurate in measurement, simple in action, and moderate in price.

Manufacturers of the ordinary Wet and Dry Meters, Governors, Photometers, and all other Gas and Water Apparatus.

JOHNSON'S PLACE, LUPUS STREET, LONDON, S.W.

CITY OFFICE: 2, CASTLE COURT, BIRCHIN LANE, E.C.

JOHN VICKARY,

GAS ENGINEER AND CONTRACTOR, IRON AND BRASS FOUNDER,

WORKS—EXE ISLAND, EXETER,

Tenders his best thanks to the various Gas Companies in **England, Ireland, and Wales,** for the very liberal and kind support he has received for the last **22 years,** during which period he has erected and extended above **200 Gas-Works.**

In addition to the numerous towns wherein he has been engaged, he begs reference to the following testimonial:—

Plymouth and Stonehouse Gaslight and Coke Company.

Sir,—I have much pleasure in testifying that the 100-foot Telescope Gasholder and Cast-Iron Tank, erected by you for this Company in 1862, has given the highest satisfaction, and never required the slightest attention or adjustment since its completion.

(Signed) PETER ADAMS, Chairman.

He has also erected a 100-foot Gasholder and Cast-Iron Tank at **Exeter;** an 80-foot Telescope Gasholder and Iron Tank at **Devonport;** a 90-foot at **Torquay,** &c. &c. At either of those works satisfactory references can be made.

He also begs particular attention to his **Improved Gas-Meters,** either **Wet, Dry, or Compensating,** the materials and workmanship of which guaranteed of the very best description, and which has gained for his Meters so excellent a reputation for these last **20 years.**

RETORTS, DIP & ASCENSION PIPES, HYDRAULIC MAIN, CONDENSERS, PURIFIERS, STATION-METERS, GOVERNORS, VALVES, and GASHOLDERS,

Of any size, and every description of article required in Gas-Works.

Mains, Tees, Connexions, and Syphons, from 2 to 12 in., always in stock, and supplied at Scotch prices.

Clay Retorts and Fire-Goods of every description.

Gas-Fittings of the most modern designs.

Iron Pipe and Fittings, Service Cocks, &c.

Plans, Specifications, and Estimate for the erection of New Gas-Works of any size furnished.

TO COUNTRY GAS COMPANIES & OTHERS.

WANTED, by a Manager of the above, a situation to take charge of a Work as MANAGER. Can give 5½ years testimonials, and has had 20 years experience.

Address T.B., Malden Gas Company, Malden, SURREY.

TO GAS-METER MANUFACTURERS.

WANTED, by a Gentleman experienced in the above trade, to represent a first-class House. He has a large connexion with the principal Gas Companies in England, Ireland, and Wales. A liberal salary will be expected. First-class references, and security to any amount.

Address INDEX, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by the Advertiser, a situation as WORKING MANAGER of a Gas-Work. Can set retorts, lay mains and services, and do all the general repairs for a Gas-Work. Good references.

Address W. F., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by the Camborne Gas Company, a second-hand CONDENSER. Size of pipe not less than 6 inches.

WILLIAM BAILEY, Manager.

GAS-WORKS.

TO ENGINEERS AND BUILDERS.

WANTED, plans and specification for the erection of GAS-WORKS at the Joint Lunatic Asylum, at Carmarthen, to supply Gas for 500 burners, and the Gasometer to be capable of containing 7000 cubic feet of Gas.

Plans, specification, and tender for carrying out the same, including all necessary buildings complete, to be forwarded to Dr. HEARDER, Medical Superintendent, at the Asylum, on or before Tuesday, the 14th day of April next. Dr. Hearder will supply all further information that may be required.

Carmarthen, March 17, 1868.

TO GAS COMPANIES.

WANTED, by the Advertiser, a situation as MAIN and SERVICE LAYER. Understands the general fitting and repairs of meters. Competent to take charge of a small country Work.

Address JOHN ROBERTSON, 2, Italian Walk, Vauxhall Gardens, LONDON.

WANTED, to purchase a second-hand PURIFIER, size 10 ft. by 6 ft.

Apply, stating price, to CHAS. S. ANN, Secretary to Gas Company, Old Swindon, WILTS.

GASHOLDER FOR SALE.

GASHOLDER, 28 ft. diameter and 12 ft. deep, prepared to Telescope, with 5 cast columns, FOR SALE, at Pembroke. Erected by Horton in 1866.

Particulars and price to be obtained from Mr. H. P. STEPHENSON, 15, Abingdon Street, WESTMINSTER.

TO GAS COMPANIES, ENGINEERS, &c.

TO BE SOLD, by the Wandsworth and Putney Gaslight and Coke Company, a TELESCOPE GASHOLDER—Inner Lift, 46 ft. 4 in. diameter by 16 ft. deep; Outer Lift, 47 ft. 10 in. diameter by 16 ft. deep, together with the columns and girders complete.

For further particulars, and to view, apply to the Company's Engineer, Mr. H. E. JONES, Gas-Works, WANDSWORTH.—By order of the Board,

ALFRED LASS, Secretary.

March 23, 1868.

COAL TAR.

TO BE LET, immediately, for One, Two, or Three years, the TAR produced at the Works of the Sunderland Gas Company. Quantity about 200,000 gallons per annum.

The principal manufacturing station of the Company has a siding on to the North-Eastern Railway, and is a short distance from the South Dock.

The Directors will receive tenders until May 1.

JOHN H. COX, Secretary.

GASHOLDER FOR SALE.

ONE, 40 ft. diameter and 16 ft. deep; Four, 40 ft. diameter and 13 ft. deep; One, 28 ft. diameter and 8 ft. deep. All quite new.

For particulars apply to THOS. PIGGOTT & SON, Swallow Foundry, Spring Hill, BIRMINGHAM.

FOR SALE—a Gasholder, second-hand, in good condition, 20 ft. diameter by 14 ft. deep; and Cast-Iron TANK, 22 ft. diameter and 14 ft. deep, with 3 columns, framing, chains and balance-weights, inlet and outlet pipes, and valves complete. There is over 22 tons of iron in the Tank. The whole to be sold for £145 as it stands.

Address G. A. S., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

FOR SALE, the undernoted Gas-METERS, the whole of which have been made since 1862, and are stamped in accordance with the requirements of the "Act for Regulating Measures used in Sales of Gas," are offered for Sale at a reduction of 50 per cent.

Made by Messrs. COWAN, EDINBURGH:—

38 5-light Meters. } Esson's Patent Compensating Fountain.
119 3-light do. }
24 2-light do. Kay's Patent.
23 3-light do.

Made by ALDER, EDINBURGH:—

25 No. 1 Meters.

The whole of the above Meters, being surplus stock of the "Perth New Gas Company," have only been in use for a short time, and are in good order.

For particulars apply to the SECRETARY of the "Perth Gaslight Company."

REDCAR, YORKSHIRE.

THE Directors of the Redcar Gas Company desire TENDERS for a GASHOLDER, 50 ft. diameter, to be erected on their Works.

Plan and specification may be seen on application to Mr. C. WOODALL, Gas-Works, STOCKTON-ON-TEES.

Tenders must be sent in before Saturday, April 4, and the lowest will not necessarily be accepted.

Stockton, March 17, 1868.

NOTICE.

THE Town Council of Northampton is about to appoint an INSPECTOR of Gas-Meters, under the Act of 22nd and 23rd Vic., cap. 66. Salary £100 per annum.

Persons desirous of being appointed to the office will, before the 2nd of April next, sent a written application, accompanied with testimonials of fitness, addressed to the Town-Clerk, Northampton, sealed up and endorsed "Gas Inspector."

By order,
JOHN JEFFERY, Town-Clerk.

Town Hall, March 3, 1868.

THE Winslow Gas & Coke Company, Limited, desire TO LET their WORKS for a period of Five or Seven years, from the 1st day of July next.

Applicants are referred to the Secretary for particulars and terms of letting. Sealed tenders, subject to such terms, are to be delivered to him on or before Monday, the 20th day of April next.

The Directors of the Company do not pledge themselves to accept the lowest or any tenders.

JOHN GRACE, Secretary.

Winslow, March 16, 1868.

TO COAL FACTORS, MERCHANTS, &c.

THE Directors of the Wandsworth and Putney Gaslight and Coke Company are now prepared to receive TENDERS for 7050 tons of best GAS COALS, from the 1st day of August, 1868, to the 31st day of March, 1869.

The tenders must state the description of the Coal, together with the price per ton for each description.

The Coals are to be delivered in the following monthly quantities in M'Murray's Wharf, alongside the Gas-Works, at Wandsworth, the Company paying the lockage and porterage dues (each monthly delivery to be distributed throughout such period as evenly as possible):—

August,	1868	550 tons.
September	,,	850 ,,
October	,,	1100 ,,
November	,,	1000 ,,
December	,,	1000 ,,
January,	1869	1000 ,,
February	,,	800 ,,
March	,,	750 ,,
Total		7050 ,,

The whole of the Coals to be unscreened, and free from bats, dirt, or pyrites, and fit for Gas purposes to the satisfaction of the Company's Engineer for the time being.

The Directors do not bind themselves to accept the lowest or any tender; but the person or persons whose tender may be accepted will be required to execute a contract for the due performanee thereof.

Tenders to be forwarded under seal to the Offices of the Company, No. 14, High Street, Wandsworth, on or before the 13th of April next, endorsed "Tender for Coals." By order of the Board,

ALFRED LASS, Secretary.

14, High Street, Wandsworth, March 23, 1868.

TO MANUFACTURING CHEMISTS & OTHERS.
AMMONIACAL LIQUOR.

TENDERS are required by the Directors of the Swansea Gaslight Company for the purchase of the whole of the AMMONIACAL LIQUOR produced at their Works at Swansea (about 180,000 gallons per annum), for a period of Three years from the 1st day of April instant.

Sealed tenders to be addressed to the undersigned on or before the 6th day of April.

THORNTON ANDREWS, Manager.

Swansea, March 26, 1868.

TO IRONFOUNDERS.

THE Keighley Local Board of Health is prepared to receive TENDERS for the supply and erection of a Cast-Iron GASHOLDER-TANK, 104 ft. 6 in. in diameter and 20 ft. deep.

Plans and specification may be seen, and any other information obtained, on and after Monday, the 6th of April next, on application to the undersigned at the Gas-Works Offices, KEIGHLEY.

Tenders to be sent in on or before Thursday, the 16th of April next, addressed to "The Chairman of the Gas-Works Committee," and endorsed "Tender for Gasholder-Tank."

The lowest or any tender not necessarily accepted.

By order,
March, 1868. JOHN LAYCOCK, Manager.

THE Directors of the Southampton Gaslight and Coke Company are desirous of SELLING the following apparatus:—A set of Four PURIFIERS, 12 ft. square, with centre hydraulic valve, covers, and sieves; an Annular CONDENSER of four columns and chambers, with 12-in. connexions; about 120 ft. run of Cast-Iron HYDRAULIC MAIN, D-shape, 14 in. by 12 in., with 75 complete sets of ascension-pipes and mouthpieces.

Full particulars may be obtained of Mr. DURKIN, Manager, Gas-Works, SOUTHAMPTON.

NEWTON ABBOT GAS COMPANY,
SOUTH DEVON.

THE Directors of the above Company are ready to receive TENDERS for the surplus TAR and AMMONIACAL LIQUOR made at their Works for a term of one, two, or three years, as may be agreed upon, from March 26, 1868. Quantity from 10,000 to 15,000 gallons per annum.

The Works are eligibly situated for carriage, being very close to the railway station, and on the banks of the river Teign, which is navigable—nearest port, Teignmouth.

Tenders to be sent to the SECRETARY on or before April 6, 1868.

Further particulars on application to Mr. JOHN BEARNE, the Manager.

PHŒNIX GASLIGHT and COKE COMPANY.

NOTICE is hereby given, that the HALF-YEARLY GENERAL MEETING of PROPRIETORS holding previous to Christmas last £300 paid-up capital and upwards in the said Company, will be held, pursuant to the Act of Incorporation, on WEDNESDAY, the 8th proximo, at Twelve for One o'clock, at the Bridge House Hotel, in the Borough of Southwark, for the purpose of declaring a Dividend to Christmas last, to elect Directors and Auditors for the ensuing year, and on other business.

By order of the Court of Directors,
ISAAC ADOLPHUS CROOKENDEN, Secretary.

70, Bankside, London, S.E., March 12, 1868.

All the Directors retire, but seven are to be re-elected, the remaining three, likewise the two Auditors, offer themselves for re-election. The qualification is £2000 capital stock, held for more than three months, and notice 14 days prior to the Meeting.

Shareholders are particularly requested to notify change of address.

TO COAL TAR DISTILLERS.

THE Directors of the Great Yarmouth Gas Company are prepared to receive TENDERS for the surplus TAR produced at their Works for One, Two, or Three years, from the 1st of March, 1868, the quantity being from 20,000 to 30,000 gallons.

Tenders to be sent to Mr. W. H. WILLIS, Secretary.

TO GAS ENGINEERS.

THE Directors of the Kingsbridge Gas Company are desirous of receiving TENDERS for supplying the necessary materials for and constructing during the ensuing summer a range of Four Beds of RETORTS; two of the Beds or Ovens to be capable of receiving a bench of five Retorts each, and the other two capable of receiving three Retorts each.

Two of the benches of Retorts to be fixed in place ready for work—viz., one of five, and one of three. The Retorts to be of clay. The contract to include the chimney, all the masonry and brickwork, the stays or braces and tie-plates to masonry and brickwork, the hydraulic main, stand, dip, and all other pipes, condensers, valves and purifiers, and all the necessary apparatus, free of freight and carriage, for making, purifying, and conveying the gas that may be made by at least ten Retorts in full work at the same time to the inlet of the existing gasholder, which is about 70 ft. in a direct line from the wall against which the back of the Retorts is intended to be placed.

The work must be completed, ready for making gas, on or before the 1st day of September next.

Sealed tenders, endorsed "Tender for Gas-Work," to be sent not later than Monday, the 20th day of April proximo, to the Secretary of the Gas Company, Kingsbridge, Devon, of whom any further information may be obtained.

The Directors do not pledge themselves to accept the lowest or any tender.

By order of the Directors,
W. JARVIS, Secretary.

Kingsbridge, March 11, 1868.

POPE & PEARSON'S Gas Coal.—We beg to call the attention of all Gas Companies to this important winning, at a depth of 1275 feet. The yield of gas is more than 10,000 cubic feet per ton, with an illuminating power of 20 spermaceti candles, producing 12¼ cwt. of coke per ton. The Coals are now being used by the Gas Companies in London. One Engineer, after trial, gives the following results:—

10,000	cubic feet per ton, and	19·13	candles.
11,468	,,	16·57	,,
12,000	,,	15·42	,,
13,260	,,	15·00	,,

This valuable Coal can be delivered in London within 1s. per ton of the ordinary Newcastle Gas Coal; can be shipped at the ports of Hull and Goole, or by railway to any station.

For further particulars, apply to POPE AND PEARSON, West Riding and Silkstone Collieries, near Leeds, YORKSHIRE.

CATHELS'S Patent Four-way Disc GAS-VALVE, now in general use, is the best Valve for Purifiers, Scrubbers, Station-Meters, and other apparatus in Gas-Works, ONE VALVE SERVING AS THREE ORDINARY VALVES, with a simplification of the connecting-pipes. It is simple, strong, and durable; has no springs, ground faces, or rubbing surfaces; is easily worked, and indicates at a glance the passage of the gas.

CATHELS'S Patent District Dry Gas GOVERNOR is the only perfect self-acting contrivance for regulating the pressures in the higher levels of a district. It enables such pressures to be reduced to any extent desired, and yet be INCREASED AND DIMINISHED, AS WANTED, PROPORTIONATELY WITH THE INITIAL PRESSURE. It is simple, certain in its action, and of moderate cost.

For descriptive circulars, prices, and testimonials, of the Valve and Governor, apply to the Manufacturers, Messrs. GUEST AND CHRIMES, ROTHERHAM.

TO GAS ENGINEERS & FITTERS.

EVERY description of Gas Lanterns and Reflector Lamps for Shop Windows kept in stock. W. DAVIS, 17, Wells Street, Oxford Street, LONDON, W.

W. J. SIMMONDS,
Retort and Boiler Setter and Contractor for Gas-Works in general,
7B, SOUTH STREET, NEW NORTH ROAD,
ISLINGTON, LONDON, N.

Upwards of 16 years Retort Setter to the Chartered Gas Company, Brick Lane and Curtain Road Stations.

Materials supplied on reasonable terms if required, or labour only.

No connexion with any other Retort Setter.

N.B.—Orders to be addressed as above.

FRASER'S PATENT RIBBED RETORTS.

These Retorts are now used at more than 60 Gas-Works, and continue to give satisfaction.

The Iron Retort is recommended for great durability. The Clay Ovens and Retorts obtain a more speedy and perfect carbonization of the Coal.

To ensure the excellence of the Brick Ovens and Fire-Clay Retorts, the Patentee has made arrangements with the following makers for their supply:—

Messrs. J. CLIFF & SON, Wortley, near Leeds.
E. BAKER & Co., Stourbridge.
W. COCHRANE CARR, Newcastle-on-Tyne.
W. FRASER, Inverkeithing, N.B.

Full particulars, with illustrated circular, testimonials, and prices, will be forwarded on application to A. C. FRASER, Gas-Works, COLCHESTER.

LAMP-POSTS—Plain & Ornamental.
DWARF GAS-PILLARS—Do., do.
LAMP-BRACKETS—Do., do.
LAMPS, in Copper, Tin, and Iron—Do., do.
NUMBERS for STREET-LAMPS.
FOUNTAINS—Garden and Drinking.
VASES—for Gardens, Terraces, &c.

A Book of the newest DESIGNS for these will be forwarded free on receipt of 3s. 6d. in stamps, which will be allowed on first order.

TURNER AND ALLEN,
Founders & Contractors,
201, UPPER THAMES STREET, LONDON.

BIRTLEY IRON WORKS,
CHESTER-LE-STREET,
DURHAM.

Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.

Warehouse in London for Cast-iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

Office in London, Mr. E. M. PERKINS, 78, Lombard Street.

B. CARPENTER'S
IMPROVED
WOOD SIEVES FOR GAS PURIFIERS.

WORKS:
14, JOHN STREET, PENTONVILLE ROAD,
LONDON, N.

The above Sieves are used by the principal Gas Companies in London and the country. Their utility, durability, and cheapness combined, render them superior to all others.

Testimonials from Gas Engineers who have tested their qualities forwarded on application.

All orders punctually attended to, and estimates given if required.

NO NECESSITY
FOR
CANNEL COAL
If POPE and PEARSON'S GAS COAL is used.

WEST RIDING AND SILKSTONE COLLIERIES,
NEAR LEEDS.

NINETEEN YEARS PRACTICAL EXPERIENCE.

EDWIN BENTLEY,
RETORT SETTER,
29, LOWER HOPE STREET, HALIFAX,
YORKSHIRE.

Fire-Clay and Iron Retorts, Double and Single Grooved Brick Retorts, of every description.

Bentley's Improved D Brick Segment Retorts, 5 or 3 in one bed.

Testimonials and references on application.

F. SIMMONDS, Senr.,
221, KINGSLAND ROAD,
RETORT & BOILER SETTER

For the Chartered Gaslight Company, Brick Lane and Curtain Road Stations, and numerous Gaslight Companies, London and Provincial.

NO CONNEXION WITH ANY OTHER RETORT SETTER.

Estimates given with or without materials.

JOSEPH RATCLIFF & SONS,
BRASS & IRON FOUNDERS,
Manufacturers of
BRASS GAS-FITTINGS, CHANDELIERS, &c.,
In various styles; also of
PATENT WELDED WROUGHT-IRON TUBES AND FITTINGS.
Catalogues and prices on application at the
WORKS AND SHOW-ROOMS,
NEW CHURCH STREET, SUMMER LANE,
BIRMINGHAM.

Now Ready, in One Volume, 4to, price £1 1s.,

THE FIFTH EDITION OF

CLEGG'S TREATISE ON COAL GAS,

Illustrated by Numerous Lithographs and Wood Engravings.

The rapidly increasing sale of each succeeding edition of this Standard Work on Gas Lighting since its first publication in 1841, and its large circulation on the Continent and in America, shows the greatly extended interest of the subject, and that this Treatise has been found a valuable exposition of the various processes and apparatus employed in the manufacture and distribution of coal gas.

This edition has been carefully revised, and most portions of the work have been enlarged and re-written to adapt it to the present state of knowledge. Ten new plates and fifty additional wood engravings have been introduced, and one-third of new matter has been added to the letterpress. Though this "Treatise on Coal Gas" has thus been considerably enlarged, the publishing price has been reduced one-third.

LONDON: TRÜBNER & CO., PATERNOSTER ROW.

And to be had by order at the Office of this JOURNAL.

EDWARD COCKEY & SONS,

IRON-WORKS, FROME SELWOOD,

PATENT GAS-VALVES.

A PRIZE MEDAL

WAS AWARDED TO THE PATENTEES AT THE INTERNATIONAL EXHIBITION OF 1862.

These Valves are formed of two cylinders, working one on the other horizontally, having their faces ground perfectly gas-tight.

They are adapted either as central valves, for two, three, or four purifiers—as bye-passes—or as inlet and outlet-valves for gasholders.

They have been fixed in some of the most important Gas-Works in the Kingdom, for more than eight years. Considerably over two hundred of them are now in use, and the most satisfactory reports of their advantages continue to be received. They are simple in construction, and not liable to get out of repair, and if in course of time the faces should leak, they can be easily re-ground and made as tight as ever, without removal from their positions. Each Valve is fitted with an index, which shows to the person in charge of the Works in what direction the gas is passing.

Frome, January 20, 1866.

PURIFICATION OF GAS.

FRODINGHAM IRONSTONE MINES,
NEAR
BRIGG, LINCOLNSHIRE.

Gas Companies can be supplied from these Mines with OXIDE of IRON, for the purification of Gas, on reasonable terms, and in any quantity that may be required.

This material is a natural Oxide, and is supplied to Gas Companies as taken from the Mines, without any admixture of deleterious matter. It acts freely, and will purify a much larger quantity of gas per ton, than the generality of the material now in use under this name.

It will be found highly beneficial in large establishments, where they are liable to be called upon occasionally to make a much greater quantity of gas than usual, as well as in small establishments where they are limited in space, as by its adoption a much larger quantity of gas can in much less time be purified with the same quantity of material.

Apply to Mr. JAMES SHERWOOD, at the Mines; or to Mr. LIVESEY, 6, Victoria Street, WESTMINSTER, London Agent.

THE
BRITISH IRON TUBE COMPANY,
MANUFACTURERS OF
PATENT WELDED WROUGHT-IRON TUBES & FITTINGS,
For Gas, Steam, and Water;
SCREWING TACKLE, CORE BARS,
Hydraulic and other Tubes and Coils, to order.

WORKS, WAREHOUSE, & OFFICES:
28, CHARLOTTE STREET, BIRMINGHAM.
AGENTS IN LONDON:
D. W. OGG AND CO., 3, JEFFREY'S SQUARE, ST. MARY AXE.

D. W. OGG and CO. have lately engaged to represent one of the largest shippers of Scotch Cannels at prices that cannot fail to command the attention of Gas Companies at a period like the present, when quality of gas seems so desirable.
Offices, 3, Jeffrey's Square, St. Mary Axe, LONDON.

ROBERT MACLAREN and CO., EGLINTON FOUNDRY, GLASGOW,
Manufacturers of all sizes of Cast-Iron Main Pipes, by an improved Patent. General Ironfounders, Gas Engineers, and Wrought-Iron Tube Makers.

ROBERT DEMPSTER,

Gas Engineer and Contractor, Rose Mount Foundry, Elland, near Halifax.

R. D. recommends his Fire-Brick Retorts to Engineers and Managers of Gas Companies; they last from 10 to 12 years.

Iron and Fire-Clay Retorts.
Annular and Pipe Condensers.
Scrubbers and Purifiers, all sizes.
Steam-Engines and Exhausters.
Hydraulic Centre-Valves.
Station-Meters and Governors.
Photometers & Pressure-Gauges.
Lamp-posts and Brackets.
Cast-Iron Mains and Syphons.
Wrought-Iron Tubes, Water Tanks.
Wrought-Iron & Cast-Iron Roofs.
Gasholders, Single-Lift or Telescopic.
Gas Castings of every description.
Retort Setters and Fitters sent to all parts of the country.
Wood Sieves for Purifiers.

Plans and Specifications prepared.

GEORGE ANDERSON,

GAS AND CONSULTING ENGINEER,

19, NORTHUMBERLAND STREET, STRAND, W.C.

MR. ANDERSON advises Companies on all matters connected with the manufacture of Gas and the construction of Works.

PATENTEE and MANUFACTURER of the following Inventions:—

RETORT SETTINGS, heated by tar without the production of smoke.
STEAM-ENGINES and EXHAUSTERS, separately or combined.
FOUR-WAY VALVES, one of which is equal to three ordinary Valves.
STATION GOVERNORS—the Gasholder cannot tilt and cause accident.
BREEZE AND TAR FUEL MACHINE.

A Pamphlet containing Eighteen Illustrations of the foregoing, with letterpress on the construction of Works, post free, 2s. 6d.

N.B.—The second edition of this Work, *now ready*, contains illustrations of the Machine for converting Breeze and Tar into Fuel for heating the Retorts.

"The Author is well qualified to speak authoritatively upon the important subjects to which his pamphlet refers."—*Artizan.*

THE LIQUID METER COMPANY,

LIMITED.

A. A. CROLL, Chairman. GEORGE RAIT, Managing Director.

238, KINGSLAND ROAD, LONDON, N.E.

INVERKEITHING FIRE-CLAY WORKS.

WILLIAM FRASER,

Having recently greatly enlarged these Works, can undertake

CONTRACTS AT LOW PRICES TO ANY EXTENT.

FIRE-CLAY RETORTS WERE FIRST MADE AT HIS WORKS,

And to this Department great attention is paid. Wherever used they have given satisfaction.
He invites attention to the following certificates.

TESTIMONIALS BY SOME OF WM. FRASER'S CUSTOMERS.

I.—*The late* F. LYON, *Esq., Manager and Engineer of the Edinburgh and Leith Gas-Works.*

Edinburgh and Leith Gaslight Company, Edinburgh, March 13, 1855.

Dear Sir,—In reply to yours of the 10th inst., I have to state that we have used Fire-Clay Retorts, made at the Inverkeithing Works, for twenty-five years. For upwards of ten years, I may say, we used them exclusively, and found them give satisfaction. For the last fifteen years we have been getting a part of our clay retorts from other makers. We find yours to stand better than some, and equal to any we have yet tried.—I am, &c., FRAS. LYON.
Wm. Fraser, Esq., Inverkeithing.

II.—JOHN REID, *Esq., Engineer and Manager of the Edinburgh and Leith Gaslight Company.*

Leith, Jan. 29, 1867.

Dear Sir,—In compliance with your request, I hereby certify that I have employed Fire-Clay Retorts of your manufacture, both here and elsewhere, for upwards of twenty-four years, with much satisfaction. I find them capable of sustaining the highest working temperature, under which they last as well as any I have seen used. They are possessed of a special quality, by which the carbon which accumulates inside is very easily removable, without injury to the Retort itself; and the style of workmanship and finish is all that can be desired. I have no objection to your making use of this testimony, so far as you may think it useful in promoting your business elsewhere.—I am, &c., JOHN REID, Engineer and Manager.
Wm. Fraser, Esq., Inverkeithing.

III.—J. Z. KAY, *Esq., Founder and Engineer, Glasgow.*

Phœnix Iron-Works, Glasgow, Oct. 30, 1867.

When I was manager and engineer of the two Gas-Works in Dundee, I used extensively Fire-Clay Retorts manufactured by Mr. Fraser, Inverkeithing. They were also generally used in other works where I acted as consulting engineer. I have pleasure in stating that I consider Mr. Fraser's Retorts to be of a very superior quality, and are not surpassed by any of which I had experience. I have often had occasion to visit his works, and observed that special attention was paid to the manufacture of Retorts, which have been made there, with manifest success, for upwards of forty years. Gaslight Companies may order these Retorts with every confidence that they will give satisfaction. J. Z. KAY.

IV.—*The Late Mr.* DOW, *Manager, Stirling Gaslight Company.*

Stirling Gaslight Company's Office, Jan. 29, 1855.

Dear Sir,—I have much pleasure in testifying to the excellence of the Fire-Clay Retorts made at the Inverkeithing Brick-Works.

I have used them constantly in the Stirling Gas-Works for upwards of eighteen years. *They last with me not less than four years. Some of them are now going the* SIXTH YEAR, and give uniform satisfaction.

From their greater durability, I prefer them to all other retorts I have tried, made by other celebrated makers.

I use those of the circular form, 14 inches diameter and nearly 4 inches thick, 9 feet long, and made in two pieces. Some approve of thinner retorts, and in one piece, but I find that kind suits me best, and order them so accordingly.

I have every confidence in recommending the Inverkeithing Retorts and other fire-clay articles manufactured there.—I am, &c., JOHN DOW, Manager.
Wm. Fraser, Esq., Inverkeithing.

V.—*Messrs.* R. TULLIS & CO., *Auchmuty and Rothes Paper-Mills.*

Auchmuty and Rothes Paper-Mills, Jan. 29, 1866.

We have used Fire-Clay Retorts, got from Inverkeithing, in our Gas-Works for the period of twenty years; and having found them to be of a quality uniformly good, we can confidently recommend them to others, believing them to be the best in the market. R. TULLIS & CO.

VI.—JOHN ROBERTSON, *Esq., Manager, Kinross and Milnathort Gas-Works.*

Kinross and Milnathort Gas-Works, Jan. 29, 1867.

I feel happy at having the privilege to adhibit my name to the certificate in favour of your articles. In regard to the Retorts and other materials manufactured at your works, I can bear ample testimony to their superiority, as I have had the practical experience of working them for the last twenty-seven years.
Mr. Fraser, Inverkeithing. JOHN ROBERTSON, Manager.

VII.—GEORGE AITKEN, *Esq., late Manager of Dalkeith Gas-Works.*

Dalkeith Gas-Works, Aug. 15, 1848.

I intend to be over in the course of a few days to order some more Retorts. You will, perhaps, be surprised to learn that some I got formerly have gone four years, and are still in good condition. They might go longer, with some repair, but I think it better not to risk them.
Mr. Fraser, Inverkeithing. GEORGE AITKEN.

VIII.—A. M'PHERSON, *Esq., Manager, Perth New Gas-Works.*

Your Retorts in one piece give entire satisfaction.
Mr. Fraser, Inverkeithing. A. M'PHERSON, Manager.

IX.—WM. M'KENZIE, *Esq., formerly of Cupar, now of Dunfermline.*

Gas-Works, Dunfermline, Oct. 31, 1867.

Retorts and other materials made at Inverkeithing Fire-Clay Works have been used almost exclusively at these works since their establishment, nearly forty years ago. My own experience of them, here and at Cupar-Fife, extends over fourteen years. These Retorts have invariably given me great satisfaction. They last well, and are quite equal if not superior in every respect to any others which I have used.
WM. M'KENZIE, Manager.

X.—WILLIAM HISLOP, *Esq., Manager of Falkirk Joint-Stock Gas-Works.*

Joint-Stock Gas-Works, Falkirk, March 22, 1854.

The Retorts which we got from you in November, '52, have been cooled down three times, and are still almost as good as that day they were put on.
WILLIAM HISLOP.

XI.—ROBERT DOUGLAS, *Esq., Manager of Gas-Works, Newcastle-on-Tyne.*

Newcastle-on-Tyne Gas-Works, Nov. 12, 1867.

Fire-Clay Retorts and other materials manufactured by Mr. Fraser, Inverkeithing, were very largely used at the Bankside and Vauxhall Stations of the Phœnix Gaslight Company for ten years, when I was superintendent at these stations. I used them previously, when manager of Cupar Gas-Works, Scotland. My experience of them extends to nearly thirty years. His manufactures are of so superior a quality that I can confidently recommend them. It appears to me his fire-clay is peculiarly suitable for making Retorts, and that he has benefited by his lengthened experience. In Scotland, Inverkeithing Retorts have, during forty years, justly maintained a high reputation, and are principally used on the east and centre of that kingdom. They have been introduced into various works, both in England and Scotland, where I was consulted, and always gave satisfaction. RO. DOUGLAS.

XII.—D. HUNTER, *Esq., Superintendent, Phœnix Gas-Works, Greenwich.*

Greenwich Gas-Works, Jan. 31, 1855.

I used the Inverkeithing Fire-Clay Retorts at a work in Scotland, of which I was manager for several years, and can recommend them as equal in durability to any I have yet tried. DAVID HUNTER, Superintendent.

XIII.—J. DOUGLAS, *Esq., Superintendent and Secretary, Portsea Island Gaslight Company.*

Gas-Works, Portsea, Nov. 12, 1867.

I have pleasure in stating that Mr. Fraser's Retorts have been used three years on these works; that I have also had experience of them in other places; that I find them carefully made and well burned; that, from the nature of the material and the manufacture, they are durable and easily heated; and that, while I rank them equal to any, I consider them superior to most that I have tried.
J. DOUGLAS, Superintendent and Secretary,
Portsea Island Gaslight Co.

XIV.—*Certificate by Managers and Secretaries of various Gas-Works, in* 1855.

Retorts and other materials manufactured at Inverkeithing Fire-Clay Works have been used in our Gas-Works for the period annexed to our names, and have given every satisfaction. We can confidently recommend them. We believe these Retorts are not surpassed by those manufactured at any other works. They generally last two, but sometimes three years.

Managers Names.	Gas-Works.	Number of Years used.
DAVID TAYLOR	Abernethy	2
WILLIAM GALLOWAY	Alyth	6
ALEXANDER M'EWAN	Auchterarder	8
D. KINNIMOND	Auchtermuchty	10
J. ADAMSON	Anstruther	10
J. ROSS MACVICAR, Secretary	Bridge of Allan	11
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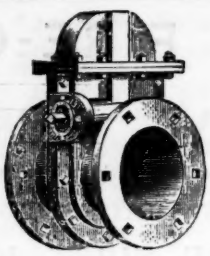

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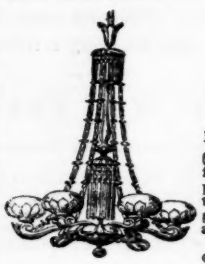

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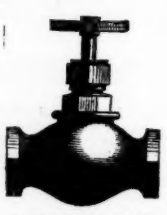

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¼ inch	£0 4 0
⅜ ,,	0 4 6
½ ,,	0 6 0
¾ ,,	0 8 6
1 ,,	0 11 0
1¼ ,,	0 14 0
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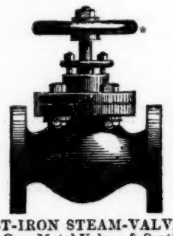
2 ,,	1 2 6



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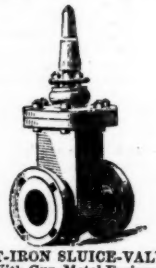
9 ,,	8 15 0
10 ,,	10 10 0
11 ,,	12 5 0
12 ,,	14 0 0



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8 ,,	6 16 0
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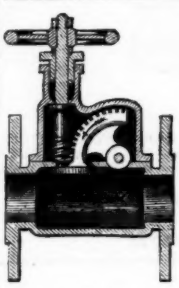

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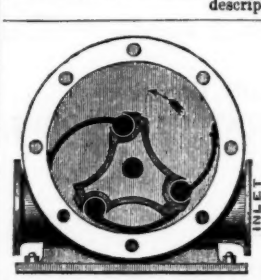

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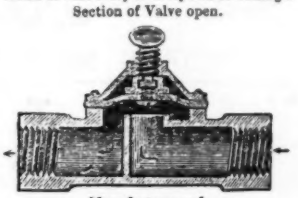

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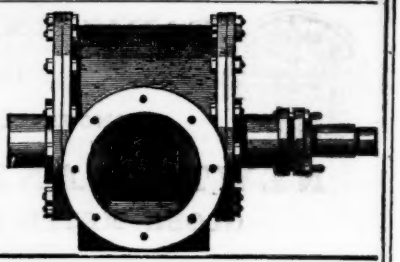

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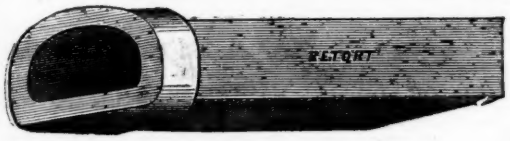

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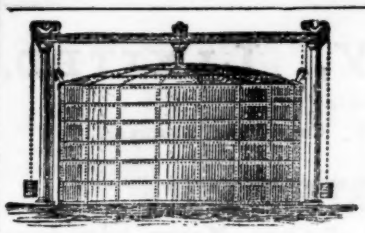

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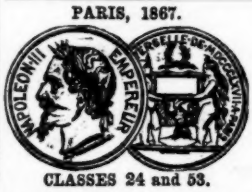

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